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NOTICE.

Each volume of the *Journal* published since 1899 contains the papers presented to the Institute between January and December of the calendar year; the minutes of the Annual Meeting in January, with the President's Address, and the Reports of the Treasurer and Council forming the introduction to each volume. The present volume, therefore, contains those papers which were presented between January and December, 1903; and opens with the President's Address delivered in January, 1903.

For convenience of reference, all volumes of the new (imperial octavo) series which began in 1898 are numbered in continuation of the old demy octavo series, Vols. I–XXVII. Thus Vol. I of the imperial octavo series=Vol. XXVIII of the old series; and the present Vol. XXXIII corresponds to N.S. Vol. VI.

The Index to the present volume includes an index to the Institute's monthly publication *Man* for the year of issue 1903; a copy of which is sent to all Fellows of the Institute in due course.

This copy of *Man*, together with the present volume of the *Journal*, completes the ordinary publications of the Institute for 1903.

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ERRATA.

On p. 92, l. 35, for *fourth* read *sixth*.
On p. 92, l. 36, for *sixth* read *seventh*.
On p. 93, l. 2 and throughout, for *Boaz* read *Boas*.
On p. 167 and throughout, for *R. T. Latcham* read *R. E. Latcham*.
On Plates XIX and XX for *Kayan* read *Kayanez*.

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— Hellenic Society.
— India Office, Whitehall.
— Japan Society.
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— Nature.
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— Royal Society.
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Sarajevo... Landesmuseum (Wissenschaftliche Mittheilungen aus Bosnien).
Vienna... Anthropologische Gesellschaft.
— K. Akademie der Wissenschaften.

Belgium.

Brussels... Académie Royale des Sciences, etc. de Belgique.
— Société d'Anthropologie de Bruxelles.
— Société d'Archéologie de Bruxelles.

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Copenhagen... Société des Antiquaires du Nord.

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Lyons... Société d'Anthropologie de Lyon.
Paris... L'Anthropologie.
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Paris... Revue de l'Histoire des Religions.
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— Année Sociologique.

Germany.

Berlin... Berliner Gesellschaft für Anthropologie, Ethnologie, und Urgeschichte.
— K. Museum für Völkerkunde.
— Seminar für Orientalische Sprachen.
Breslau... Centralblatt für Anthropologie, etc.
Gotha... Petermann's Mittheilungen.
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Stuttgart... Zeitschrift für Morphologie und Anthropologie.

GREECE.

Athens... Ephemeris Archaiologikè.
— Annual of the British School of Archæology.

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RUSSIA.

Helsingfors... Suomen Muinais Muistoyhdistyksen Arkakauskirja (Journal of the Finnish Archæological Society).
Moscow... Imper. Obshchestvo Lubitelei Iestestvoznania, Antropologii, i Etnografii.
St. Petersburg... Imper. Akademia Nauk.

SWEDEN.

Stockholm... Academy of Antiquities, National Museum.
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AFRICA.

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CANADA.

Montreal... Royal Society of Canada.
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UNITED STATES.

Cambridge, Mass.... Peabody Museum, Science.
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New York... American Museum of Natural History.
Philadelphia... Free Museum of Science and Art (University of Philadelphia, Department of Archæology).
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— L'Homme Préhistorique.

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JANUARY TO JUNE.

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Each Fellow shall pay an Annual Contribution of two guineas, which may at any time be compounded for by a payment of £21.

The Annual Contributions shall become due upon election (unless such election takes place in the month of November or December) and in advance on the first day of January in each year afterwards.

There is at present no Entrance Fee.

Fellows residing in the country, as well as in London, can borrow books from the Library.

Persons who wish to become Fellows of the Institute are requested to communicate with the Secretary.

JOURNAL

OF THE

ANTHROPOLOGICAL INSTITUTE

OF GREAT BRITAIN AND IRELAND.

ANNUAL GENERAL MEETING.

JANUARY 27TH, 1903.

A. C. HADDON, Sc.D., F.R.S., *President, in the Chair.*

The Minutes of the last Annual General Meeting were read and confirmed.

The Election was announced of the following as Ordinary Fellows of the Institute:—Mr. A. M. BROACHA, Mr. W. EVANS, Mr. J. GRAY, Mr. B. HOUGHTON.

The PRESIDENT announced that the following had been elected Honorary Fellows of the Institute:—Mr. A. W. HOWITT, for distinguished services to the ethnology of Australia; Dr. F. VON LUSCHAN, for numerous contributions to ethnology; and Dr. S. REINACH, for researches in the early history of civilization in the Mediterranean and Western Europe.

The PRESIDENT declared the ballot open, and appointed, as Scrutineers, Mr. D. RANDALL-MACIVER and Mr. H. LING ROTH.

The TREASURER presented his Report for the year 1902 (p. 8).

The SECRETARY read the Report of Council for the year 1902 (p. 2).

On the motion of the PRESIDENT, seconded by Mr. CROOKE, the Reports were accepted *nem. con.*

The PRESIDENT delivered his Annual Address (p. 11).

The SCRUTINEERS gave in their Report, and the following were declared to be duly elected as Officers and Council for the year 1903:—

President.—H. Balfour, Esq., M.A.

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Prof. Arthur Thomson, M.A.

Mr. H. Balfour, having taken the Chair, returned thanks for his election, and proposed that a hearty vote of thanks be given to Dr. A. C. Haddon, the outgoing President, and that he be requested to allow his Address to be printed in the *Journal* of this Institute. The motion was seconded by Prof. E. B. Tylor and carried unanimously.

On the motion of Mr. E. W. Brabrook, seconded by Mr. C. H. Read, a vote of thanks was passed to the outgoing members of Council.

REPORT OF COUNCIL FOR THE YEAR 1902.

The Council is able to report another year of steady progress and extended usefulness. The numerical gains and losses are represented in tabular form as follows :—

	Honorary Members.	Corresponding Members.	Local Correspondents.	Ordinary Members.		Total Ordinary.	Total Membership.
				Compounding.	Subscribing		
On Jan. 1, 1902 ...	43	17	16	69	231	300	376
Less losses by death and resignation.	− 2	− 4		− 2	− 12	− 14	− 20
Since elected ...	+ 3		+ 2	+ 4	+ 32	+ 36	+ 41
Since transferred				+ 1	− 1		
On Jan. 1, 1903 ...	44	13	18	72	250	322	397

Among the losses which the Council has with regret to record are Professor Rudolf Virchow, Major J. W. Powell, Professor Ch. Letourneau, Dr. Thomas Wilson, Dr. J. H. Gladstone, and Mr. H. Stopes.

In RUDOLF VIRCHOW Germany laments one of the founders of modern pathology, and one of the most original and vigorous intellects of the nineteenth century. To anthropology his principal services were rather in the direction of far-sighted organization of inquiry, than in any great output of personal research. He took an active part in the foundation both of the German Anthropological Society and of the Berlin Society for Anthropology, Ethnology, and Prehistoric Studies; for many years he took a large share in the editorship of the *Archiv für Anthropologie*; the Museum für Völkerkunde was, in great part, the outcome of his representations; and the great survey of the physical characteristics of the German people, which is his greatest anthropological achievement, stands at the same time as a monument of well-designed collaboration, and is an example of what private enterprise and strictly scientific inquiry can be made to contribute to the study of great national and practical problems. A great thinker, a great teacher, and at the same time a great figure in the practical politics of his country, Virchow's work leaves its mark on almost every department of German biological study, and his death a gap which this generation can hardly hope to fill.[1]

The death of Major JOHN WESLEY POWELL removes one of the most marked personalities among American anthropologists. In his case, too, in spite of his early fame as the explorer of the canyons of Colorado, it is rather as an organizer and administrator than as an explorer, or even as a teacher, that he will be remembered hereafter; and his creation of the Bureau of Ethnology, no less than his administration of the United States Geological Survey, is a memorable testimony to his foresight, energy, and resource.[2]

In CHARLES LETOURNEAU French anthropologists have lost an original and suggestive thinker, and the École d'Anthropologie de Paris one of its most eminent professors. Following on the lines laid down by Comte and by Herbert Spencer, but with a closer and more special acquaintance than either with the data of ethnography, he made it his life-work to study the phenomena of human society as a naturalist might study an ant-heap; to collect, classify, and display a vast series of observations, and upon them to found an inductive sociology on strictly anthropological lines. Vigorous and facile in style, rapid and accurate in his methods of work, he published, mainly as the outcome of successive courses of lectures, a series of over a dozen distinct monographs, from the *Sociologie d'après l'Ethnographie* of 1879, which first laid down the outlines of his inquiry, to the *Psychologie Ethnique* of 1901, which he seems to have regarded as summing up his principal conclusions, and as setting his previous volumes in their true perspective. At the École d'Anthropologie he held the chair of Sociology and the History of Civilization since 1885, and won the reputation of a scholarly, sympathetic, and stimulating teacher; and as General Secretary of the Anthropological Society of Paris his wide knowledge and strong common sense gained him respect and influence among a still wider circle of acquaintances.

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[1] Cf. the obituary notice in *Man*, 1903, 1, appended to this volume of the *Journal*.

[2] Cf. the obituary notice in *Man*, 1903.

A genial spirit has passed away by the death of THOMAS WILSON, Curator of the Division of Prehistoric Archaeology in the United States National Museum. For many years a consul in France, it was only comparatively late in life that he became a professed archaeologist. Though the lack of early training was always apparent, his wide practical knowledge of French archæology proved of great service in his studies of the stone implements of North America. Mr. Wilson was a most diligent worker. His more important publications were "The Swastika," *Report U.S. Nat. Mus.*, 1894 (1896), pp. 757–1011, 25 pls., 374 pp.; "Prehistoric Art," *l.c.*, 1896 (1898), pp. 325–664, 74 pls., 325 figs.; and "Arrow-points, Spear-heads, and Knives of Prehistoric Times," *l.c.*, 1897 (1899), pp. 811–988, 65 pls., 201 figs.; and we understand that he left another large memoir ready for publication. All those who have visited the great collections displayed in the building of the Smithsonian Institution will recall with pleasure the enthusiasm and friendliness of its Curator.

Whether as a chief founder of physical chemistry in England, or as an unwearied educational reformer, the name of Dr. JOHN HALL GLADSTONE will long be treasured by all who knew him. During his twenty years of membership of the Anthropological Institute, his interest in metallurgical problems made him at all times a valued contributor to its discussions, as well as to the *Journal*; and his investigations into the early history of copper and bronze, in Egypt and elsewhere, did much to throw light upon a very obscure corner of prehistoric archaeology.

By the death of Mr. H. STOPES, the science of prehistoric archaeology has lost an enthusiastic student and an indefatigable collector. He amassed an enormous number of implements, mainly Palæolithic, rightly judging that long series were all-important in scientific study. By profession an engineer, and himself skilled in the use of tools, Mr. Stopes regarded an implement from the aspect of utility, and he was led to the conclusion that the men of the Drift gravels led a more complex life than we are apt to imagine.

For election as Honorary Fellows the Council has selected the following:—Mr. A. W. Howitt, for distinguished services to the ethnology of Australia; Dr. von Luschan, for numerous contributions to ethnology; and Dr. S. Reinach, for his researches into the early history of civilization in the Mediterranean and Western Europe.

MEETINGS.

During the year ending December 31st, 1902, eleven ordinary meetings were held, as against nine in 1901; besides two special meetings, the Huxley Memorial Lecture, and a visit of inspection paid to the museums of the University of Cambridge.

The visit to Cambridge took place on Saturday, July 5th, and was attended by some twenty persons. At the Fitzwilliam Museum, in addition to the permanent collections, a temporary loan exhibition of porcelain and other glazed wares was found to be open. The Museum of Archæology and Ethnology was fully described by the curator, Baron A. von Hügel; the Anthropological Department of the Anatomical Laboratory, by Mr. W. L. H. Duckworth; and the collections which resulted from the Cambridge Expedition to Torres Straits, by the President of the Institute. To Dr. Haddon's initiative was also owing the hospitable reception which the Fellows and their guests enjoyed in the garden and hall of Christ's College.

HUXLEY MEMORIAL LECTURE.

The third Huxley Memorial Lecture was delivered on the 28th October, 1902, in the Lecture Theatre of Burlington House, by kind permission of the Office of Works; the President of the Institute being in the chair. The lecturer, Prof D. J. Cunningham, M.D., D.C.L., F.R.S., discussed the problems of "Right-Handedness and Left-Brainedness," in their anatomical and physiological relations, and illustrated his discourse with numerous photographic exhibits. The Huxley Memorial Medal, which is designed to commemorate the services rendered by the lecturer to Anthropological Science, was duly presented to Professor Cunningham at the conclusion of his address, which will be found published in full in the *Journal* of the Institute, Vol. XXXII, p. 273, and also in separate form.

PUBLICATIONS.

During the year under review, two half-yearly parts of the *Journal* have been published without serious delay, namely the second part of Vol. XXXI and the first part of Vol. XXXII; and the preparation of the second part of Vol. XXXII, due in January, 1903, is already far advanced. Both in volume, in quality, and in the number and style of their illustrations and plates, the Council believes that these parts will be found to compare favourably with their predecessors, and with analogous publications elsewhere: and that the very marked increase in the proceeds from sales (p. 8), which has occurred during the year under review, is sufficient justification for the Institute's present policy in regard to its *Journal*.

In addition to the ordinary *Journal*, the first of a series of *Special Publications* has been issued, namely a brief *Ethnological Survey of Eastern Uganda*, by Mr. C. W. Hobley. It consists of nearly 100 pages of text, of the same size and style as the *Journal*, with an ethnographical map and five collotype plates. Unlike the *Journal*, it was issued in the first instance by subscription.

The publication of *Man* also seems to have succeeded in stimulating a growing interest in anthropological matters, often in unexpected quarters; and continues to attract a steady flow of valuable contributions. Three minor changes have been adopted as the result of two years' working. (i) The increased bulk of the *Journal* has made it desirable to separate *Man* from the half-yearly parts, and to issue all twelve numbers of *Man* together in a separate cover at the end of the year. (ii) This change, in its turn, makes it possible to give the Fellows the choice of receiving the copy of *Man* to which their subscription to the Institute entitles them, either all together at the same time as the second part of each volume of the *Journal*, or in separate monthly parts such as are issued to the subscribers to *Man*, on payment in the latter case of a nominal charge of 1*s.* 6*d.* to cover cost of transmission; and the Council is glad to find that a considerable number of the Fellows are already making use of this choice. (iii) To accommodate the increasing number of reviews of recent books and papers, and to secure more rapid publication for them, a supplementary sheet has been added to *Man*, raising its total capacity from 16 to 20 pages monthly.

The compilation of the British section of the anthropological volume of the *International Catalogue of Scientific Literature* has made steady progress. The preliminary difficulties reviewed in last year's Report have been to some degree surmounted as the work went forward; the volume for 1901 is almost ready for press; and the Council has every reason to believe that the British section will at all events not fall behind the standard attained by other countries whose activities are less hampered by the indifference and parsimony of the State.

LIBRARY.

The Library, in spite of its quite inadequate grant of £10 for binding and arrears, has made substantial progress. The total number of periodicals received in exchange for the *Journal* or for *Man* is 146 (as against 130 in 1901), of which 40 are English, 15 Colonial and Indian, and 93 Foreign; and special attention should be drawn to the large number of rare local publications which are thus made accessible to British students of the subject. The current binding is well in hand, and progress is being made, as occasion offers, in dealing with the large arrears in this department.

The acquisitions of books and pamphlets show a slight increase—256, as against 236 in 1901. That this increase is not larger is no doubt partly due to the difficulty of reviewing promptly so large a number of books in the limited space which has been available hitherto in *Man*; but this difficulty has now been met, as already described, by the expansion of this section of *Man*, and the Council looks forward confidently to the co-operation of authors and publishers in bringing the best recent works to the notice of the anthropological public.

Express mention was made in last year's Report of the imminent need for further accommodation for the Institute's Library and other collections, and for a time it seemed as if it would be necessary to seek new quarters. But a fortunate accident early in 1902 greatly changed the situation, and the extensive structural repairs which ensued have not only greatly increased the book-capacity of the premises themselves, but also gave the opportunity for a thorough revision of the contents of the shelves. Much second-rate matter has been consigned to a newly fitted store-room in the basement; useless duplicates have been eliminated; and a system of arrangement by subjects has been carried out, which greatly facilitates the use of the library. Work has been begun upon the long-planned subject catalogue; and also upon the no less necessary catalogue of *desiderata*, which it is hoped will in time become an index to the literature which the Library does *not* possess, with indications to the nearest place of access to each item.

The collection of photographs has been increased by numerous gifts; in particular by a number of photographs of natives of British dependencies, transferred from the library of the Colonial Office; by a valuable series of studies of the Andaman and Nicobar Islands, executed and generously presented by Mr. E. H. Man; and by a large series of negatives and prints of Algerian subjects, presented by Mr. D. Randall-MacIver.

The collection of lantern slides also grows slowly, and begins to be used. It was, however, necessary to postpone activity in this department until the reorganization of the Library was completed; and in next year's Report there will probably be more progress to record.

EXTERNAL.

Turning to matters less connected with internal administration, the Council notes with satisfaction increasing signs of appreciation both of the scientific and of the practical value of anthropological studies.

In particular, a correspondence which has taken place between the Institute (in conjunction with the Folklore Society) and the Colonial Office, in regard to the native races of South Africa, indicates both a distinct recognition on the part of the Government of the complexity of the questions involved, and a willingness to facilitate unofficial inquiry, which may be trusted to bear fruit in due time.[1] And it cannot be doubted that in the course of his personal investigation of the affairs of the new Colonies, the Colonial Secretary will find strongly urged upon him, by those who have the best right to speak—the officials, namely, who administer the new Department of Native Affairs—the paramount necessity of accurate first-hand knowledge of native law, custom, and belief, in dealing with so large and heterogeneous a population; if not even of some general preliminary training on anthropological lines, in the case of Civil Servants whose work is to lie among non-European peoples mainly.

In India, meanwhile, as the reports of the recent census begin to appear, it is becoming possible to estimate the extent to which ethnological material of the first importance has been accumulated and utilized by the census officials. Of this material some fragments indeed, by the goodwill of the Director of Ethnography, Mr. H. H. Risley, and others, have already been communicated to the Institute and published without delay in *Man*; the first-fruits, it may be hoped, of many similar communications, as the pressure of more urgent matters is overcome.

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[1] The correspondence will be found published in full in *Man*, 1903, which is appended to this volume of the *Journal*.

In the same connection, the organization of a great Loan Collection of Indian Art and Industry at Delhi, in connection with the Coronation Durbar, seems especially worthy of note as a token of a wider interpretation of the duties of suzerainty; and the Viceroy's words at its inauguration testify both to the expectations which the experiment has excited, and to the intimate connection which is beginning to be felt to exist between anthropological studies in the wider sense and the practical art of government.

At home, too, signs are perceptible of an awakening of the older Universities to modern requirements in this matter. In the University of Cambridge, the University Lecturers in Ethnology and Geology, with the collaboration of the Reader in Geography, have initiated courses of lectures and practical instruction, to serve as a training for explorers, and for military officers, civil servants, missionaries, and others who may desire to undertake scientific work when stationed abroad. These courses, which are open to members of the University and others, include instruction in various departments of geography and geology, anthropogeography and practical ethnology. Oxford, meanwhile, has included in a recently published forecast of its "needs" a detailed review of the growth of anthropological study hitherto, with a definite demand for systematic teaching and for a diploma-course like that which is already conceded to geography.

Under these circumstances the year 1903 opens favourably for increased activity on the part of an Anthropological Institute. The preliminary reorganization of the Institute's office, and routine-administration, is well advanced; the Library has been rearranged; the Publications have been amplified and improved; and the way seems open for making the offices of the Institute more definitely the centre for organized anthropological work than has sometimes been possible hitherto.

TREASURER'S REPORT FOR THE YEAR 1902.

The income of the Institute for the year 1902 was £747 10*s.* 11*d.*, being £62 10*s.* 6*d.* more than the income for 1901. The total of the subscriptions received was £100 16*s.* more than in 1901, but that includes five life subscriptions, whereas in 1901 there were none at all. The receipts from publications were £172 15*s.* 2*d.* for two numbers of *Journal* published, against £214 0*s.* 8*d.* for three numbers of *Journal* published in 1901. These therefore show an increase in ratio, though not in amount.

The actual expenditure during the year was £624 6*s.* 6*d.*, to which have to be added about £120 for *Man* for 1902, shortly to be issued in a separate volume to the Members, and about £140 due for *Journals* in excess of the amount

ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Receipts and Payments for the Year 1902.

RECEIPTS.	£ s. d.	£ s. d.	£ s. d.
SUBSCRIPTIONS :—			
Five Life Subscriptions at £21		105 0 0	
For the year 1902		407 8 0	
Arrears		25 4 0	
For the year 1903 in advance		16 16 0	554 8 0
SALE OF PUBLICATIONS			169 3 2
ADVERTISEMENTS in *Journal*			3 12 0
DIVIDENDS for one year on Metropolitan Consolidated 3½ per cent. Stock (less Income Tax)			16 9 0
INCOME TAX returned (less cost of collection)			2 3 11
EXCURSION ACCOUNT (balance)			1 14 10
LIBRARY FUND :—			
Balance, 1st January		13 11 9	
Sales of Books		5 0	
Grant to (as per contra)		10 0 0	
		23 16 9	
Less paid for Shelves	4 6 0		
Less paid for Binding	6 8 6		
		10 14 6	
			13 2 3
"MAN" :—			
Balance 1st January		104 16 3	
Received during year		57 18 9	
		162 15 0	
Less paid during year		157 19 2	
			4 15 10
"ANTHROPOLOGICAL NOTES AND QUERIES" :—			
Balance, 1st January		21 10 9	
Received during year		6 1 3	
			27 12 0
HOBLEY'S "UGANDA" :—			
Received		16 3 10	
Paid		15 16 11	
			6 11
			£793 7 11

PAYMENTS.	£ s. d.	£ s. d.	£ s. d.
BALANCES due on 1st January, 1902 (as per contra) :—			
To *Man*		104 16 3	
To *Notes and Queries*		21 10 9	
To Library Fund		13 11 9	
		139 18 9	
Less Balances in hand { At Bank	79 14 4		
{ Petty Cash	5 16 10		
		85 11 2	
			54 7 7
RENT (including Coal, Gas, and Electric Light for one year to Michaelmas, 1902)			135 0 0
PRINTING JOURNALS (Vol. IV, New Series), including illustrations and Authors' copies		284 8 3	
Less received for Plates, Corrections, etc.		8 11 3	
			275 17 0
SALARIES			102 12 6
HOUSEKEEPER :—			
Cleaning rooms, etc.			16 15 6
STAMPS AND PARCELS			42 6 3
PRINTING AND STATIONERY			18 17 3
LANTERN MATERIALS			2 0 6
ADVERTISING			4 2 6
HUXLEY MEDAL AND MEETING			3 8 0
TRAVELLING EXPENSES			8 10 2
GRANT TO LIBRARY (as per contra)			10 0 0
INSURANCE, REPAIRS AND SUNDRIES			4 16 10
BALANCES IN HAND :—			
Cash at Bank		106 13 10	
Cash in Hand		2 17 6	
Petty Cash		5 2 6	
			114 13 10
			£793 7 11

Examined and found correct,

(Signed) RANDALL H. PYE, } *Auditors.*
JOHN GRAY, }

15th January, 1903.

due last year, so that the income appears to have been exceeded by about £140. The general expenses have been cut down to the lowest point possible, and show a slight decrease under nearly every head, but the cost of Vol. XXXII of the *Journal*, recording the proceedings for the year 1902, and of the numbers of *Man* for that year, about to be issued to the Members, will not, I expect, fall far short of £400.

The liabilities at the end of 1902 (other than the moral liability to life members) were:—

	£	*s.*	*d.*
Rent, etc., for one quarter	33	15	0
Man, about	125	0	0
Journal and miscellaneous printing as per accounts rendered	160	0	0
Hobley's *Uganda*, as per accounts rendered	7	10	0
Journal in press, say	100	0	0
Anthropological *Notes and Queries* ...	27	12	0
Library Fund and sundries, say... ...	21	3	0
	£475	0	0

The assets at the same date were:—£500 Metropolitan 3½ per cent. Consolidated Stock (worth about £540), and cash in hand and at Bankers', £114 13*s.* 10*d.* (say £655 together), besides the library, furniture, stock of publications, blocks, etc., and some unpaid subscriptions.

The cash assets may therefore be taken to be £655 against cash liabilities of £475, of which liabilities £100, being for the *Journal* now in the press, may be set against the income for 1903, leaving a reserve of only £280, of which no more than the odd £80 should in my opinion be used for ordinary purposes.

A. L. LEWIS, *Honorary Treasurer.*

PRESIDENT'S ADDRESS.

ANTHROPOLOGY, ITS POSITION AND NEEDS.

A PECULIARITY of the study of Anthropology is its lack of demarcations; sooner or later the student of Anthropology finds himself wandering into fields that are occupied by other sciences. The practical difficulty of drawing a dividing line between the legitimate scope of Anthropology and that of other studies is so great that we are often told there is no science of Anthropology. This lack of definiteness adds a charm to the subject and is fertile in the production of new ideas, for it is at the fringe of a science that originality has its greatest scope. It is, however, only by a synthesis of the various studies which are grouped together under the term Anthropology, that one can hope to gain a clear conception of what man is, and what he has done.

It may be logically consistent to distribute portions of Anthropology among other sciences, but the result would be that the subject would suffer, and unless a society like our Anthropological Institute busied itself with the study as a whole, it would be developed very unequally. Indeed, to be quite candid, at the present time there is very little direction in the evolution of Anthropology, or in the study of its various branches. Usually a piece of work is done because the student happens to be interested in a casual statement or observation of another worker, or because he chances upon some collection of crania or weapons. Too rarely has work been systematically entered upon because it needed doing at the time.

The Science of Man is concerned with a portion of the same series of studies as are Zoology and Botany, but unlike them it must be considered as it were in several planes. The lowermost plane is generally known in this country under the term Physical Anthropology, the "Anthropology" of many writers; for which we also have the useful term of Anthropography. A plane above this may be conveniently termed Ethnology. A higher plane is that known as Psychology. Beyond this we need not go at present.

Anthropology, like Zoology and Botany, may be studied under the aspects of Anatomy, Taxonomy, Embryology, Palæontology, Physiology, Œcology, and Ætiology.

ANTHROPOGRAPHY.

The Anatomy of man is dealt with by the human anatomist, and it is only when the anatomy and histology of the different races of men are treated comparatively that they may be said to be anthropological. That is, (1) the purely descriptive study of man's anatomy is Human Anatomy, preliminary alike to comparative research and to practical application in medicine and surgery; (2) the comparative anatomy of man with other animals is Comparative Anatomy, (3) the comparative anatomy of man with man is Anthropography.

The analysis and classification of the various races of man is strictly a branch of systematic, or taxonomic, Zoology; but if this subject had been left to the zoologists, very little would have been known at the present day about the races and peoples of mankind, and we are thoroughly justified in taking it over. The geographical distribution of the human varieties comes in here, and would have been similarly neglected if it had been left to the general geographer.

The Embryology of man is clearly on the outskirts of Anthropography; comparative human Embryology can scarcely be said to exist, but when it does it will fall more directly within our province.

The Palæontology of man has always been accepted as within the scope of Anthropography, although it is equally a branch of Vertebrate Palæontology.

Human Physiology is primarily a part of comparative Physiology; it is only when the functions of individuals of various races are compared *inter se* that they become anthropographical.

The Œcology of the nature-folk passes by such insensible grades into that of the culture-folk, that it is difficult in practice to draw the line between them. The inter-relations between the physical and biological environment on the one hand and the mere gatherers of food, the hunters, and even the simplest agriculturists on the other, are very similar to those of mere animals, and so far one may speak of an Anthropographical Œcology.

Finally, Ætiology in Anthropography, as in Zoology and Botany, seeks to rationalize the evolution of the individual and of the race. While the embryologist and palæontologist study and describe the facts of Ontogeny and Phylogeny, the ætiologist seeks to reach a rational explanation of each of these processes.

ETHNOLOGY.

On turning to a higher plane we leave the natural man (ἄνθρωπος or *homo*), and pass to the cultural man (*socius*), and in Ethnology, or Sociology, as it may be termed with equal propriety ("the natural history of social life," as Dr. A. H. Post terms it), we can retain a series of studies analogous to those in Anthropography and Zoology and Botany. A description of a single group of man (ἔθνος), is best described as Ethnography, and should be a monographic study including alike Anthropography, Ethnology (Sociology), and Psychology.

The anatomy, so to speak, of the cultural man (*socius*) is Descriptive Sociology, or the analysis of his institutions, and Technology, which is the description and comparison of the tools he employs.

Social Taxonomy deals with the clan, family, tribe, nation, and similar groups. The geographical distribution of these must not be lost sight of, and, as in Zoology or Botany, is conveniently treated by the taxonomist.

The origins and developmental phases of the occupations and institutions of cultural man are the analogue of the Embryology of the natural man, and must be taken together with Archæology, which is the Palæontology of History.

The actual functioning of the occupations and institutions of cultural man bears the same relation to their analysis that physiology does to anatomy, but the relation is more intimate, as the one can scarcely be considered apart from the other. As the objects made by man belong to the analytical category, so here may be taken all methods of conveying ideas or information, from gesture language to linguistics.

The inter-relations between various social groups, between male and female, clan and clan, tribe and tribe, nation and nation, is that form of Œcology which is more generally known under the name of Economics and Politics.

Finally we have the attempt at an evolutionary interpretation of all human history, or Ethnological Ætiology.

PSYCHOLOGY.

A third plane of the study of man is one in which the limitations of the classification in the animal plane are largely transcended. Anthropography deals with man solely as an animal; Ethnology, or Sociology, studies all the enterprises of social man. Psychology takes us into the inner sanctuary of man, and while it, too, has its roots in his animal nature, it flowers, so to speak, in a realm of its own.

The physiology of the senses passes through Psychophysics into Psychology proper. Sensations and mental operations can be analysed and classified; their genesis can be studied partly by observation, partly by inference.

Objects made by man may be studied concretely; the uses to which they are put in the individual or social life can be described; but there is also a Psychology of invention, a Psychology of social function, a Psychology of language.

The Psychology of the individual, the comparative Psychology of groups are both subjects for study. Thus we arrive at the Psychology of Economics and Politics: but have we not already passed beyond the legitimate bounds of our science?

ETHNOLOGY (SOCIOLOGY).	Archæology.	Social Taxonomy.	Economics and Politics.	Philosophy of History.
	Evolution of Institutions.	Analysis of Institutions and Technology.	Functioning of Occupations and of Institutions. Linguistics.	Criticism of Institutions.
ANTHROPOGRAPHY.	Palæontology of Man.	Racial Classification of Man.	Anthropographical Œcology.	Rational Phylogeny.
	Comparative Human Embryology.	Comparative Human Anatomy.	Comparative Human Physiology.	Rational Ontogeny.
BIOLOGY.	Palæontology.	Taxonomy.	Œcology.	Rational Phylogeny.
	Embryology.	Anatomy.	Physiology.	Rational Ontogeny.

I am indebted to my friend Professor Patrick Geddes for the greater part of this classification, which I think will assist us to classify readily the work done by most investigators in the field of Anthropology.

The sociologist can study customs irrespective of races, the anthropographe can describe skulls without reference to religion; but a combination of all the aspects of Anthropology is necessary, if we are to have a broad and deep view of the history of man.

As an opportunity will shortly be provided to the Fellows of the Institute to discuss the classification of the departments of our science, I do not propose to enter here into further detail. My reason for touching upon the subject at all was not to offer a consistent or elaborate scheme of classification, but rather to suggest a general survey in the hope that my fellow-students may carefully consider the lines upon which future research may be undertaken with profit. I do not mean to imply that any line of investigation is unprofitable; but there are times and occasions when one branch of inquiry is more immediately desirable than another; and we, of all men, should direct the development of our science.

It would take too long for me to review the present state of all the branches of Anthropology, but I would like to take this opportunity of making a few remarks on certain aspects of present research in our science.

While the anatomical characters (Somatology) of the various human groups have been sedulously studied, their physiological and psychological characteristics have been almost totally neglected. As the conditions under which the nature-folk and the lower cultural peoples have existed are now becoming so rapidly altered, it is necessary that investigations in these departments, both in their normal and pathological aspects, should be undertaken without delay. Very important is it to study, structurally and functionally, all the "pure" races (or as unmixed as can be found), in order that comparative data may be forthcoming when the mixed peoples are studied, and very soon only such will be available.

In such varied departments as craniology, sociology, and comparative religion we have patient and laborious workers, and fortunately there are not wanting the critics.

Craniologists have been, and still may be asked, to what use are put all the minute and numerous measurements that they take, and what do they really teach us?

Fierce battles are raging between the students of comparative customs and beliefs, from which it will be prudent to keep away; but I feel constrained, however, to utter one word of warning. While admitting that the comparative method of study is the only possible one under the present circumstances, it is most necessary that every precaution should be taken that the customs and beliefs which are compared are really comparable. In other branches of science one so often finds that a superficial similarity masks an essential difference, and it appears to me that the same may obtain in these studies.

One good effect of a theory or hypothesis, whether it be stable or temporary is that it sets people thinking and inquiring. Synthetic students are after all a sort of intelligence department that directs the workers in the field. The collectors of information rarely have the requisite time, knowledge, or opportunity to read as widely as they would like, and they would be apt to overlook facts in the field were it not that they have their attention directed to them by students at home.

During the last few years the lines of inquiry initiated by Dr. Francis Galton have been assiduously developed by Professor Karl Pearson and his school, and in the recent volumes of the *Proceedings* and *Transactions of the Royal Society*, and in *Biometrika*, as well as in several books written by Dr. Galton and by Professor Pearson, will be found numerous papers dealing with the problems of evolution and heredity from a mathematical point of view. The lines of inquiry investigated by the biometricians embrace all departments of Biology; not only are the most minute anatomical characters of plants and animals measured on hundreds of individuals, and their variations tabulated and put into the mathematical mill, but human psychological characters are treated in an analogous manner.

As anthropologists we welcome with delight the zeal which these investigators exhibit in wrestling with these difficult and intricate subjects. The problems of the zoologist and botanist are the same as ours, but for us they are much more complicated, so much so that the ground must be cleared by prolonged study of lower and simpler forms of life before one can hope to obtain a reasonably safe basis for researches on human evolution and heredity.

In all questions which arise when one attempts to study a process of evolution, the unit of investigation must be a population and not an individual, since the process we wish to follow is the change in race-character during successive generations.

In attempting to compare races as closely related as the races of mankind, or even in attempting to compare closely allied species of lower animals (especially if we try to understand the minutely differentiated species of modern botanists or conchologists, for example) it often happens that the boundary of one race or species overlaps that of another; so that an isolated specimen may belong to either of two species or races, and we can only determine the characters of groups of specimens. Here, again, the unit upon which a useful conception can be based, must be a population.

It is found experimentally that the results of examining large series of phenomena, each one of which depends upon a great number of complex causes, can always be tabulated in one or other of a few simple ways; and the first thing which the theory of statistics (or theory of chance) attempts to do is to describe these methods of calculating such results, and to show how to find the most appropriate way in particular cases.

By means of this theory it becomes possible to find a formula which will express the range and frequency of variations in a character, *e.g.*, cephalic index, stature, femur length, and so forth, in a whole population. Only by means of a simplification of this kind can the numerical data be grasped, and only by such means can the data afforded by different races be intelligently compared.

The first great object, therefore, is to provide a means by which the whole range and frequency of variation of a character within the limits of a race or species can be presented to the mind in a form easily realized and remembered.

The following inversion of the method just alluded to is often necessary. Assume that a population would, if you could examine the whole of its members, give a series of cephalic indices, or whatever the data may be, whose frequencies would be represented by a smooth probability curve. You cannot examine the whole of the population. In point of fact, in most cases of extinct human races, 50 or 100 skulls form the largest available series. Tabulating the frequency with which various values of cephalic index occur in such a small series, you do not find that the results run smoothly; on the contrary, your "curve of frequency" often shows more than one maximum. What can you conclude?

Most craniologists are inclined to attribute such peaks in the frequency curve, without further analysis, to the presence of more than one race in the population examined. Experimentally, such secondary maxima are exceedingly common in small series of observations, of which it is known that a longer series would give only one maximum. An important application of the theory of chance is the calculation of the odds against a given irregular result, on the assumption that the final result would be a frequency curve with one maximum, if the observations were longer continued.

From the point of view of practical anthropography this seems to be one of the most important points to consider just now.

Nearly all anthropometric series, based on measurements of extinct races, are necessarily small, and they are nearly all irregular. Before it can be concluded from this that all known races are mixed, it is necessary to calculate in each case what are the chances against the result obtained, supposing the small sample of material to be drawn from only a single race.

So far we have spoken of only one character. By means of the theory of correlation we can make a picture of the way in which variations of two, three, or more characters are associated in the different members of a population; and by taking as one variable a character in fathers, and taking as the other a character in sons, and determining the correlation between the two, we can form a picture of inheritance based on all the observed individuals both of the paternal and of the filial generation.

This is, of course, the relation which is in the long run important to evolution, far more than the fact that once here and there a particular father has transmitted a particular abnormality in an unusual degree to his sons.

In brief, the whole conception is that evolution is concerned with changes in the character of the mass of a population; that just as the manager of a railway company knows how many passengers are going by each train, though he does not know who they are, just as a banker knows he will have to pay so much money to-morrow, though he may not know which of his clients individually will draw a cheque; just as all civilized society is possible because we can calculate the doings of the masses, so we can and ought to calculate the mass-characters of those populations, human and other, whose evolution we wish to study.

I am indebted to one of my biometric friends for the foregoing statements, while another point of view may be indicated as follows:—

One is perhaps justified in stating that the chief deduction from some of the most careful of recent work on these lines goes to show that heredity is a specific phenomenon and the problem, What will A × B produce? must be determined not for each individual, of course, but for each character, each pure, non-varying species, variety, race, or whatever the group-unit may be.

Specific experimentation with human beings is almost hopelessly barred owing to the restrictions of law and religion, and consequently, of all the different sorts of biologists, the anthropologists will be the last to get certainty as to the specific heredity laws of their animal. No doubt from time to time there are good opportunities of making observations of the class that is required; for instance, the cross-breeds raised between parents of different "pure" strains are always worth precise description. But how often can the "purity" of the parents be guaranteed? The progeny of such first crosses will similarly be full of interest whenever they are *certainly* known to be so produced.

Unfortunately the material we have to work upon is generally composed of a half-breed class, a mixed population raised from half-breeds bred *inter se*, with possibly some "pure" strain of one or two other races. For example, to take an average case, the offspring of a European and a Polynesian is not a case of simple A × B. What is the racial origin of the European A? Is he a member of the pure Northern, Alpine, or Mediterranean race? If, as is most likely, he is a mixed-breed, it is impossible to determine what are the various proportions of his racial parentage, and moreover one is quite ignorant of the amount of variation within any one of these three races. Who is to say, especially at the present time, whether the Polynesian B is of technically pure descent? and taking that for granted, what is a Polynesian? The Polynesians may be a well marked human variety, but can any one assert they constitute a species in the zoological sense of the term? From these medleys the cautious biometrician should hesitate at present to draw definite conclusions, not having a sure point of departure.

It is because hitherto most heredity work has been done on material of this sort, unanalysed, and indeed incapable of analysis, that a sure foundation has been so hard to find.

I have made these statements with considerable reluctance, as I feel most strongly that the class of work I have criticized is precisely what we require. At the same time the scientific man must not jump at a method or a conclusion solely because he would like to have it.

The difficulty of obtaining ideal conditions should not prevent us from taking full advantage of those at our disposal. The observations we may make will always prove of some value, but the full extent of their utility may not be apparent for a long time. Let us not neglect the fleeting opportunities because we are not certain of the full ultimate value of our observations. It is our business to collect the data while we have the chance.

Not only have we to elaborate and extend our science, but we must impress on the public the need that the country has for it, both from an educational and political point of view.

The present is as much a part of history as the past; it is merely the current page. As Geography and Ethnology are the open pages of those portions of earth-history, of which Stratigraphy and Archæology are the pages already turned over, so the history of the earth (Geology) and the history of man are consecutive narratives that incorporate the past and the present.

We make bold to claim that the material we are collecting from all over the earth is an indispensable contribution to the science of History. It is part of our business not only to record the existing state of a people, but also to trace the influences of the friendly contact, or the inimical clash of different peoples. We had a valuable illustration of the physical effects of the former condition in the paper read last year before our Institute by Mr. T. H. Holland, under the happy title of "The Kanets of Kulu and Lahoul, Punjab: a study in Contact-Metamorphism."

The sociological and psychological effects of a gradual intermingling of two or more peoples are also well worthy of the closest scrutiny. Not less important is it to record what happens when conflict occurs, whether as dynastic war, social conflict, or religious propaganda.

It is a truism that History repeats itself, and we invite historians to consult the modern instances that we are accumulating, and we venture to hope they will find many suggestions that will serve to throw light upon past events, which otherwise might remain obscure. It is also probable that beginners would take more interest in early history if they realized that similar events were still in progress. Vice-Admiral Sir Cyprian Bridge, in his preface to Mr. Christian's book on the Caroline Islands, has pointed out various illustrations of past history in current events among the natives of Oceania.

It is hardly an exaggeration to say that new life has been given to classical studies by the introduction into the Universities of original archæological investigations, Comparative Archæology, Ethnology, and Folk-Lore. Indeed, the effort of thoroughly mastering the histories of ancient Greece and Rome in itself makes the student an anthropologist, since he is forced to recognize the help that modern parallels afford him in his studies.

My predecessors in this chair, and those elsewhere who have felt the same burden laid upon them, have so frequently pointed out to our Government the obvious duties that lie before it in respect to the aspects of our science which bear upon practical politics, that perhaps I may be excused from following their example and may be permitted to adopt the more congenial task of recognizing what *has* been done by various Governments of the Empire.

It is a hopeful sign of the times when the Colonial Secretary visits our Colonies in order to gain first-hand information concerning the local conditions.

Part of the business of the science of Sociology is to provide data which can be utilized by the practical politician, and possibly at no very distant period this fact will be clearly recognized by those who aspire to a career in affairs, and by the faculties of those institutions where men are trained for public life.

The Indian Government, which is really in touch with its work, has done something for the elucidation of the problems connected with the ethnology and archæology of India. The series of four volumes on the tribes and castes of Bengal, by Mr. H. H. Risley, and a corresponding series on the tribes and castes of the North-West Provinces and Oudh, by Mr. W. Crooke, are veritable ethnological mines. We look forward with pleasurable anticipations to the results accumulated by Mr. Risley as Director of Ethnography for India in connection with the Indian Census of 1901. The orations of Lord Curzon at the recent Durbar at Delhi indicate that he has the grip of a true statesman concerning the influences which mould peoples into a nation, and he clearly recognizes the desirability of retaining and developing the heritage of art and industrial skill of our Indian fellow-subjects. Doubtless we may look to the Government of India for further recognition of our science, but even so it may not be superfluous to recall to memory the following statement in *Man*, 1901, 113:—"It is true that various social movements, aided by the extension of railways, are beginning, as Sir Alfred Lyall and others have pointed out, to modify primitive beliefs and usages in India, but that is all the more reason for attempting to record them before they are entirely destroyed or transformed."

The Australian Commonwealth is still passing through troublous experiences, but it is encouraging to find that among fiscal difficulties and political perplexities certain Governments have not entirely neglected the investigation of the rapidly disappearing aborigines. The Queensland Government some years ago appointed Dr. Walter E. Roth to be the Northern Protector of Aboriginals, and those who have studied the *Bulletins on North Queensland Ethnography* that are being published by the Home Secretary's Department, Brisbane, gratefully thank the liberality of that Government, and admire the enthusiasm and skill of Dr. Roth.

The Government of Victoria also has helped Prof. Baldwin Spencer and Mr. F. J. Gillen in their latest memorable journey across the continent, and the Government of South Australia gave special facilities and long leave of absence to Mr. Gillen. We have heard from private sources that this expedition has met with great success, and we hope that the value of their results will stimulate the various Governments of the Commonwealth to do what they can while they can.

There are many officials who have a working knowledge of the native races whom they have to administer, and some of them publish the information they have acquired. One has only to mention Mr. Hugh Clifford, Sir Harry H. Johnston, Sir William Macgregor, Mr. Basil Thompson, and Mr. Everard F. im Thurn to bring before the mind's eye the record of very valuable contributions to Ethnology. Only last year we published, as the first of a series of Occasional Papers, an *Ethnological Survey of Eastern Uganda*, by Mr. C. W. Hobley, Sub-Commissioner of the Uganda Protectorate. But for want of a methodical record of successive generations of official experience each officer has usually to begin afresh, which means waste in every sense of the word.

Is it too much to hope that at last it is being recognized that a full knowledge of local conditions and a sympathetic treatment of native prejudices would materially lighten the burden of government by preventing many misunderstandings, and by securing greater efficiency would make for economy.

To look at it from the lowest point of view, even a slight frontier trouble means a direct expenditure for the local executive and a stagnation of trade. Trade is like a sensitive barometer that fluctuates with every small variation of pressure in the political firmament, and the pecuniary loss to the country is not to be measured by the actual cost of a trouble with natives so much as by the indirect loss to the community at large; this can rarely be estimated, but it is none the less real.

One has only to talk with those who do the work of the Empire at its borders to be quite convinced that this is the actual state of the case. There are higher grounds than mere money considerations why this policy should be carried out, and while they need not be insisted upon here, it would be a reproach to this Institute if mention of them was entirely omitted.

I am not aware that any special knowledge of the mode of thought and of the social organization of backward peoples is required of any candidate for any foreign or colonial appointment, and it was only last year, for the first time, that candidates for a post in the Ethnographical Department of the British Museum were required to pass an examination in Anthropology.

Lack of space and time preclude me from mentioning all that is being done for Anthropology by the various Governments that constitute the British Empire. There are encouraging signs of progress, and for these we are thankful, but there remains such an appalling amount of work yet to be done, that at times one is inclined to lose hope, but to do so would be a fatal mistake.

We have not yet exhausted other methods of advancing Anthropology; we have scarcely yet endeavoured to educate the masses or to interest individuals who have time or money at their disposal.

How to reach the bulk of the intelligent classes is, I take it, the main problem before us. First and foremost, we require popular exposition. The public must be shown the far-reaching importance of our subject, an importance which is not merely academic or scientific, but practical. It must be made to see that efficiency and economy as well as kindly and righteous dealing in the government of other peoples are the practical result of a sympathetic study of those peoples; that, in fact, to take the low stand-point, it "pays" to study Ethnology.

The public can be reached by popular lectures, by readable literature, by well-arranged museums, by the propaganda of societies. No vulgarization of Anthropology is advocated. Few people have any idea of the great wealth of human interest there is buried in the data accumulated in the journals of our societies, or illustrated by the specimens locked up in the cases and drawers of our museums. It is this practically unexploited wealth of interest and information that we should endeavour to disseminate.

The apathy of the public to our science probably is largely due to its students. We have been so engrossed in our researches, or so occupied with routine duties, that we have not made sufficient effort to draw the attention of outsiders to matters that might appeal to them. There are, it is true, occasional illustrated articles in our cheaper magazines, but these are generally written by persons too imperfectly acquainted with the subjects with which they deal, and are calculated to hit the fancy of the public on account of the strangeness of the subjects that are figured.

Another aspect of the question is the extreme fewness of anthropographical or ethnological appointments, and these few are miserably paid, and not one is endowed. The subject, therefore, offers no inducement to a young man who has to earn his living, and some of those who have embarked on it have to engage in various other occupations in order to pay their way.

On the Continent of Europe the professional appointments are directly or indirectly State-aided. We have almost ceased to hope for this, and it has not yet become the custom, as in the United States of America, for our wealthy men to endow the subject. Our American friends have educated their millionaires, many of whom liberally endow learning and research. It is evident that all sections of the British public require education in this direction, and it is quite possible that we ourselves are not free from blame in this matter.

We have in our Institute an establishment that is capable of developing into greater usefulness than it has had in the past, considerable though that has been. Up to the present time it has scarcely been recognized by the outside public that there is a centre to which an inquirer can go to gain information on matters connected directly or indirectly with our science.

Those of us who are engaged in teaching, or have charge of museums, or are otherwise interested in the subject, are always willing to help or advise others, but our time is limited, and people naturally feel some hesitation in obtruding upon the time of a stranger, especially when no remuneration can be offered.

Once it becomes generally known that such an institution exists, it is conceivable that people in all walks of intellectual life may desire to make use of it. Is it taking too much for granted that statesmen and politicians might like to gain a little first-hand information about the local conditions of backward peoples? Journalists should constantly consult the Institute, as almost every day something transpires on which it would be able to throw some light.

As a place of interchange of information, a sort of anthropological clearing-house, which many and diverse people would want to use and therefore be willing to pay for, this department of the Institute should in time develop into an important educational centre, and this would inevitably promote the prosperity of the Institute as a whole, and enable it to extend considerably its sphere of activity.

I have indicated some of the lines upon which our Cinderella Science is advancing, but before I finally vacate the honourable position to which you have called me, I must return once again to its most pressing need.

Students at home spend laborious hours in reading, transcribing, and collating the records of travellers and in endeavouring to make them yield their secrets. The safety of the student usually depends upon the bulk of his material, but when one considers the sources of his information one is sometimes appalled at the risks he runs. Until the last few years scarcely a single ceremony has been described with anything like adequate completeness. The data that are available have been collected under varied circumstances by men of every degree of fitness and reliability. The honest collector is as well aware, as the helpless student, of the imperfections of his record. There are but two remedies for this state of affairs—trained observers and fresh investigations in the field.

Fortunately we are now in a position to say that means do exist for the training of field-anthropologists, and we must all do our best to ensure that a scientific man trained in anthropological methods is attached to every official or private expedition.

As to the necessity for field-work, permit me to make a somewhat lengthy abstract from Vice-Admiral Bridge's introduction to Mr. F. W. Christian's book on the Caroline Islands. Sir Cyprian Bridge's first service on the Pacific Station was in 1855; consequently he is in a position to speak with authority, and an independent testimony of this kind carries considerable weight. He says:—

"If we may regard the South Sea Islands as a museum of living specimens to which students in many branches of learning may resort in order to fortify their conclusions and improve their knowledge, we must remember that it is a museum which will not be open long. The island races are diminishing, and, besides, are rapidly changing under the influence of 'civilization.' The geology of Oceania, whether examined now or a hundred years hence, will yield the same results. Even the fauna and the flora will have changed but little in a century, and in easily discernible ways. In a much shorter time the people will have died out or have been transformed into weak and ineffective copies of white originals. Therefore the student who wishes to do what Mr. Christian has done, and carry out his inquiries on the spot, had better be quick about it. The operation will help to enlarge our knowledge of the natives and their ways, and can hardly fail to benefit the Empire."

Those who have had practical experience in Oceania, or who have followed the literature of that region, will fully agree to the urgent need there is of following the advice of Sir Cyprian Bridge. But the same pressing necessity is manifest on all quarters. Again and again in the course of our reading is this fact borne in upon us, and constantly am I told by travellers that we ought to send some one here, and another man there, or we shall find ourselves too late. Uganda, Nigeria, South Africa, the Farther East, New Guinea, Australia, Oceania, and the Americas —from all the story is repeated. Nor is it a call that we can neglect with impunity and postpone till a more convenient season.

Each year sees a decrease in the lore we might have garnered, and this diminution of opportunity is taking place with accelerating speed. Oh, if we could only agree to postpone all work which can wait, and spend the whole of our energies in a comprehensive and organized campaign to save for posterity that information which we alone can collect!

THE MALAYAN POTTERY OF PERAK.

By L. Wray, Curator of the Perak Museum.

[With Plates I-III.]

The interest attaching to Malayan pottery, as made in the state of Perak, arises from the great antiquity of the art, and from the certainty of its having come down to the present time without influence from the more highly civilized nations, who have, from time to time, imparted new arts and ideas to the Malayan inhabitants of the Peninsula.

The antiquity of the potter's wheel is so great, that in most countries there is no record of its invention. It has been in use in India and China from a very remote period, yet the Malays are quite ignorant of it. It is this fact which forms the strongest proof of the great antiquity of the method of working clay in Perak, for it is inconceivable that a potter, having once learned the use of the wheel, would ever discard it and return to the slow and tedious process of forming vessels by the hand alone, or that the art could have been introduced by a foreign potter of a nation which was acquainted with the wheel, without the wheel itself being introduced at the same time.

Malayan pottery may, therefore, be looked upon as a survival, amongst a fairly civilized people, of a phase in the ceramic art far anterior to that to be found in other countries in a similar state of advancement, and, as such, appears to be deserving of some study and attention.

According to Malayan tradition, the race has not been settled for many centuries in the country, but it is very doubtful whether any reliance can be placed in this idea. It seems more probable that what is recorded as the advent of the Malays from Sumatra was only an incursion of foreign Malays into a country already inhabited by people of the same race, though possibly in an inferior state of advancement. Whatever was the early history of this part of the Peninsula, it is certain that for a long time past three races have inhabited it—the Malays, the Sakais, and the Semangs; the Malays being settled along the coast and the banks of the rivers, and the Sakais and Semangs in the interior. These latter peoples call themselves, and are called by the Malays, *Orang darat*, literally, "men of the land," and they may be considered as the aborigines. They do not make pottery of any sort, but content themselves with doing what little cooking they need in the joints of one of the larger bamboos. This is confined entirely to boiling rice, or some of the smaller grains which they grow, all other food being roasted over the fire. Of late years, those living near the town have bought

Malayan, or rather Indian, cooking-pots, in the same way as they have become possessed of woven cloths, knives, etc.

The art is practised, therefore, only by the Malays, and by them only in very restricted areas, there being but four places in the State of Perak (Fig. 1) where pottery is made at the present day. Three are situated on the banks of the Perak River; the first at Lenggong in Upper Perak, the second at Saiong, near Kuala Kangsa, and the third at Pulau Tiga in Lower Perak. Of these, the ware of Pulau Tiga is best, that of Saiong next, and that of Upper Perak worst. In other words, the higher you ascend the river, the poorer becomes the quality of the pottery. At one time, a little was also made near Bukit Gantang in Larut by some people who had come from Saiong, and settled there about two generations ago. This will be referred to later on.

At Saiong, which was recently visited by the writer, there are now only about ten houses in which pottery is made. The potters are all women, and are either old or past middle life.

The younger women do not seem to be learning the art from their elders, which is much to be deplored, as it would appear to point to the approaching extinction of this interesting industry.

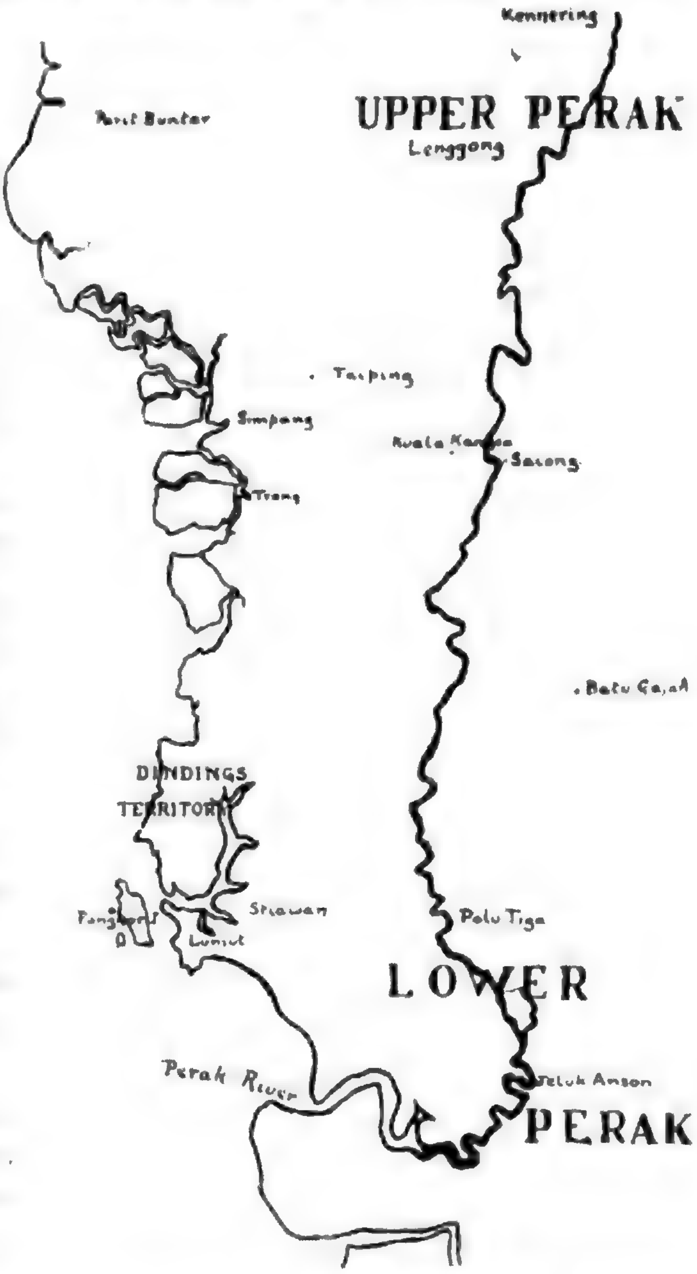


Fig. 1.—Outline Map of Perak, showing Districts in which Pottery is made.

The potters of Saiong obtain their clay from Temong, a place higher up stream. It comes down the river in boats, packed in small mat bags, and is sold to the potters. It is a fine stiff clay, and is found on a *changkat* or hillock some way from the river. The layer of clay is said to be near the surface, and only reaches down to a depth of 4 or 5 feet. There are many roots in it, proving its purely superficial character. It is of a grey-brown colour, and looks like fine grained river silt, and is doubtless of a very recent geological date.

It is prepared for use as follows:—The contents of one or more bags are turned out on to a large *mengkuang* mat, spread out in the sun on the ground, and the clay is allowed to remain there until it is dry, the larger lumps being broken up to facilitate the process. It is then pounded in a common rice-pounder, either of the pestle-and-mortar type (*lesong tangan*), or of the tilt-hammer (*lesong kaki*) type. From time to time the clay is taken out of the mortar, and sifted through a fine brass wire sieve of about sixty meshes to the linear inch. This separates the roots, sand, and other impurities from the finer portions of the clay. Formerly the clay was sun-dried and pounded, and the impurities were picked out by hand; but as this could only be done in an imperfect manner, much loss through breakage resulted when the ware came to be fired. The sieves are of Japanese make; they can be bought in the local shops, and have been in use only for the last few years.

The fine powder which passes through the sieves is mixed with water into a stiff clay. This is kneaded and beaten with a wooden club and is then allowed to rest for a day or two; it is then kneaded and beaten again, when it is ready for use. Nothing is mixed with it, neither sand, nor broken and pounded earthenware, as is so often done in other places.

When burned, the clay assumes a rather pale red tint, and sometimes becomes whitish with bluish-grey tintings. The Pulau Tiga ware burns to a darker red, being of the typical terra-cotta colour. The Upper Perak ware, on the other hand, is more often of a bluish-grey than of a pale red colour.

The implements used by the potters are of extreme simplicity, consisting only of the following articles:—

(*a*) A bat-shaped piece of wood about 8 inches long, used to pat the vessels into form, and also to consolidate the clay (Plate I, Fig. Q).

(*b*) Several thin slips of bamboo, used as knives to cut the clay, and also as spatulas to work it into form (Plate I, Fig. R).

(*c*) Many small wooden rods, with the ends cut so as to form punches or stamps; some have only one end cut as a punch, and others both. They are from about 2 inches to 7 inches in length, and are generally made of the wood called *kayu gading* ("ivory wood"), or of some other hard wood. These stamps, which are in many forms, such as crosses, roses, dots, curved, straight, and angled lines, are used to make the impressed patterns with which the ware is so largely decorated (Plate I, Fig. T, and Fig. 2, p. 33).

(*d*) A smooth stone, an old brass *chimbal* (betel box), or other suitable object, is used as a polisher to burnish the surface of the nearly dry clay (Plate I, Fig. S).

(*e*) The only other thing used is a piece of plank roughly cut into a circular form. This is about 8 inches in diameter, and is used as a stand on which to put the clay while it is being formed into a piece of pottery (Plate I, Fig. P).

There is, in the Perak Museum collection, one of these stands where the nearest approach has been made to the potter's wheel (Plate I, Fig. O). It consists of two round pieces of wood, cut out of a tree trunk, the lower of which has a central peg on which the upper revolves; but it was only used to turn round slowly by hand, as is done with the ordinary wooden discs. This apparatus is, however, of extreme interest, as showing the steps by which others in former times arrived at the potter's wheel; although in this instance that great advance has not been reached. The steps appear to be: first, the making of the vessel on a piece of wood; second, making it on a round piece of wood; third, pivoting the round piece to facilitate turning it; and the next step would be making the disc heavier, so as to be able to spin it. At Saiong, common Chinese plates have now, in a great measure, taken the place of the wooden discs.

(*f*) A cocoanut-shell, to hold water, completes the list of the tools employed.

The formation of a water-jar is effected in the following manner at Saiong: A wooden disc, or a Chinese plate, is taken and placed on a board, or on the ground, before the potter, who squats in front of it. On the plate is laid a piece of banana leaf to prevent the clay from sticking to it, and on the leaf is put a piece of well-kneaded clay, of a size judged to be sufficient to form the lower half of the jar which is to be made. This clay is then worked with the fingers into a ring of about 5 inches in diameter, the section being at this stage somewhat like a dumb-bell. This is allowed to harden a little, and is then taken again, and with the fingers of one hand inside and those of the other outside, is gradually drawn upwards until it takes the form of a cone, with the larger end below. In Plate I, 2, the clay cone to the right shows this stage. It is then allowed to stand for a few hours to harden. Then the fingers of the one hand are put inside, and the outside is patted smartly with a wooden bat; this is to consolidate and toughen the clay, and make it possible to distend it in the subsequent process.

Next a knife-shaped piece of bamboo is passed all over its outer surface, being wetted as occasion requires. The strokes are all upwards, and the fingers of one hand are held inside to maintain or alter the shape of the clay. The woman in Plate I, 2, is doing this. Gradually the pressure from the fingers inside is made to give the clay a more or less spherical shape, as shown in Plate I, 2, to the left, between the woman and the finished jar. During the whole of this time, the plate is being slowly turned round. At the end of this stage, the form of the lower part of the vessel is completed, and it is made as symmetrical as possible by eye.

The cutting edge of the bamboo is then used to trim off the ragged top edge of the clay, being pressed against the forefinger of the right hand, which is held inside, with a snipping action; and the plate is revolved by the left hand. It is then put aside to harden again.

The next process is putting on the bottom. For this, a piece of clay is taken and is made into a flat disc of about ¼ inch in thickness. It is then depressed in its centre until it assumes a saucer shape. This is laid on the piece first formed, concave side upwards; the surplus clay is cut off with the bamboo knife, used in the manner just described; and the two pieces of clay are welded together so as to form a good joint. The whole is trimmed off as neatly as possible with the aid of the fingers and the bamboo knife. This completes the lower half of the water-jar, and it is set aside to get hard enough to handle, which takes from a day to two days, according to the state of the weather. The lower half is then inverted, and what is now the upper edge is wetted, and a cone of clay, made up as already described for the lower half, is welded on to it, beaten with the bat, and shaped with the fingers and the bamboo knife. The top edge is then cut off, and a neck formed and welded on to it.

Sometimes the reverse process is resorted to. In this case, a lump of clay is taken and a cone formed, as already described; but, in place of covering in the top to form the base of the jar, a neck is built up. This is allowed to harden, and is then inverted and set in a cooking pot, or some other deep vessel, and the bottom half is built up on it. The next process is to burnish the surface, which is done by rubbing it with a stone, brass, or other suitable smooth object; the strokes of the burnisher are always vertical, and not horizontal, as in wheel work.

The piece is then ready for decoration; this is done by means of the wooden stamps already mentioned, which are pressed into the clay. Raised ribs, etc., are also formed by welding strips of clay on to the surface, and incised lines, both horizontal, vertical, and slanting, are formed with the edge or point of the bamboo knife. The decoration being complete, the work is allowed to dry for about three days, and is then put on the shelf over the fireplace, until such time as enough jars are ready for burning.

The kiln employed at Saiong is simply a square hole, dug in the ground, of any required size; one, measured by the writer, was 3½ feet square by 18 inches deep. In this is laid a layer of pieces of wood, in size from 3 inches in diameter downwards. Over the wood is put a layer of jars lying on their sides, the interstices between the jars being filled up with small pieces of wood; and then the jars are covered with a complete layer of wood on which go more jars, and so on, until the hole is filled up; a hole of the size given being sufficient to take thirty to forty jars. When all is ready, the wood is lighted, and is left to burn out, which takes from two to three hours. The clay, by this time, is of a light red colour; but if it is wished to blacken the ware, as is usually the case, the hot jars are lifted out of the kiln and buried in a mass of *padi* husk, which quickly blackens them. Whether blackened or not, it is customary to glaze the bottoms of the jars with *dammar* to render them waterproof. Formerly, before the use of sifted clay, the breakages in firing were said to often amount to thirty in the hundred, but now it is reduced to from three to four per hundred.

In dry weather it is possible to make a complete water-jar in two days; but in wet weather it takes much longer, and it is considered that one completed jar per day is about the average work of the women who make them. The selling price is about twenty-five cents, which (with the dollar at one and eightpence) is equal to fivepence. Retail, of course, they fetch rather more than this.

These water-jars are often mounted with silver, or more rarely with golden tops and stoppers; the latter being fastened to the jar by a chain attached to a silver band round the narrowest part of the neck. The mounts are cemented on with *dammar*, or a mixture of *dammar* and crushed earthenware.

At Bukit Gantang there is now only one old woman who makes pottery. She says her mother used to make it before her, and she learned from her. The mother or grandmother came from Saiong and brought the art with her. Formerly, several other women at Bukit Gantang made pottery, but they have all died now. The clay is found in a *padi* field about 2 feet from the surface. It is dried and pounded in the same way as is done in Saiong, but a sieve is not used. The powdered clay is mixed with water in which have been crushed up the leaves of a common wild plant known as *perpulut* (*Urena lobata*). This plant, when crushed, yields mucilage, and the gummy water is said to make the clay more easy to work, and harder when dry. The following is the method employed by this woman, and as it differs in several respects from the procedure of the Saiong potters, it is worth describing in detail.

A piece of wood, covered with a piece of plantain leaf, is put on the ground before the potter, and a lump of clay laid on the leaf. This clay is patted out into a disc with the hands, and then the edge is raised by bringing the thumb from the centre of the mass of clay up to the edge, where the clay, pushed before the thumb, is pressed between it and the fingers of the same hand. The edge is thus raised to about an inch, the flat bottom of clay being left about ⅓ inch in thickness. This stage is shown in Plate I, Fig. H. The upper edge is thinned out and bent inwards. A piece of clay is then taken and rolled out with the palm of the hand on a board until it is about ¾ inch in diameter, and of sufficient length to go round the jar. This is then taken and laid round the outside of the already formed edge, and cut off the right length, which is about 1 inch less than the circumference. The fingers of one hand are then put inside, and the thumb is pressed downwards outside, squeezing the outside of the ring of clay downwards, so that a slanting joint is formed with the previously shaped clay. This action is continued from one end of the newly added strip of clay right round to the other, which becomes elongated by the process, and the gap, which at first existed, is filled up. (Plate I, Fig. I.) The clay is then drawn upward, and thinned out at the upper edge as before, this edge being also bent inwards; then it is ready for another ring of clay. To make the half of a jar about three rings of clay are used. The hand is then placed inside, and the outside is patted with a wooden bat, which is wetted from time to time to prevent its sticking. This helps to weld the joints together, and generally to strengthen and toughen the clay.

Next the bamboo knife is taken and passed over the outside with upward strokes, the fingers of the left hand being held inside and pressed outwards, so as to bulge the walls out and give a more or less spherical shape to the vessel.

The rough top-edge is now trimmed off by holding the tip of the bamboo knife against the outside, and the thumb against the inside of the partly formed vessel, and turning it round with the other hand. It requires about two turns for the knife to cut right through.

With the fingers of both hands, the top edge is contracted, until it is of the size of the intended neck. The edge is then thinned out and turned inwards as usual, and the whole is put out in the sunshine to harden for an hour or two. The top edge is then wetted, and a ring of clay put round it, and welded on with the same downward action of the thumb as the former rings, and it is afterwards extended upwards and outwards, and another ring of clay added, which is treated in the same way. The neck is now beaten with the wooden bat, and is then formed into the intended shape with the fingers and the bamboo knife. The top edge is finally trimmed off with the latter, and the whole allowed to harden.

It is next burnished with a metal, or other polished object, and is then ready to be decorated by having patterns impressed on it by wooden stamps. These are wetted before use to prevent them sticking, and should a mistake be made, the impression is burnished out, and a fresh one made. At this stage there is the upper half of the jar with a flat bottom. This is shown at Plate I, Fig. M, and the intermediate stages by Figs. J, K, and L.

When it has become hard enough to stand handling, it is inverted in some suitable holder, and the bottom is wetted; the edge of the bottom is then pared off with the bamboo knife, so as to reduce the thickness at this point to about the same as in other portions of the vessel; the cut surface is then moistened, and it is patted all round with the wooden bat. The mouth of the potter is next applied to the neck of the jar, and by blowing into it, the flat bottom is distended. This is then wetted, and worked over again, and the circumference patted with the bat and the jar is inflated again, until the bottom has assumed the form it is intended to have. It is then put out to harden, and is burnished and decorated in the same way as the upper part. Should the flat bottom have become too dry to blow out a hole is made in the centre of it, sufficiently large for the insertion of a finger, and the finger is used, in conjunction with the bamboo knife, to bulge it out and give it the proper form. The hole is then filled in with a piece of clay: it is finished off and dried, and is ready for burnishing.

To form a vessel having a foot, the procedure is different. A piece of clay is taken and worked out into a disc on the plantain leaf, just in the same way as in forming the bottom of a jar, except that the upturned edge of it is bent outwards. A ring of clay is added to this edge, and the foot formed out of it. When it is as round and smooth as it can be made with the fingers, a strip of wet cloth is laid over the edge and grasped by the finger and thumb of one hand, while the board is turned round with the other hand. If done carefully, this forms the edge with a nice smooth surface and fairly circular. The whole is put out to harden, and is then inverted. The outer edge is then worked up, thinned out, and bent inwards, and a clay ring added. After about three rings have been added and welded on and beaten with the bat, the bottom half of the vessel is finished and allowed to harden. The top half is then built up on it, and the neck formed as already described. Three stages in the manufacture of this type of jar are shown in Plate I, Figs. C, D and E.

It may be of interest to note here that the method of building up jars with successive rings of clay welded one over the other, with the upper edge of each ring thinned off and bent inwards as above described, was that employed in Britain in the late Stone and early Bronze ages. A drinking cup from a barrow at Rudstone, East Riding of Yorkshire (Greenwell, Collection B.B. LXVI), and a food-vessel from a cist at Kirk Mabreck, Kirkcudbrightshire, in the British Museum, shows this structure in a very clear manner; there is also a large jar in the Museum of Archæology and Ethnology, Cambridge, of about the same date, which is a good example of this particular technique, two of the clay rings being distinctly traceable.

The only difference in the burning is that over the top of the wood and jars is laid a layer of earth. To blacken the jars, they are smoked by being put on the shelf over the fireplace (called *arang para*), which is made of sticks. During this time, they are kept filled with water which is changed every few days.

The forms of the vessels are almost without exception traceable to two types, the one being derived from the bottle-gourd (*Lagenaria vulgaris*, Ser.), and the other from the shell of the cocoanut. There are also occasionally to be seen cylindrical vessels, evidently taken from the bamboo, and other forms, copied from recently introduced earthenware, which are of little interest.

The first type is called *labu tanah*, or "clay bottle-gourd." Many of these are exact copies of the natural fruit, while others are furnished with a foot and more or less modified necks.

In Plate II is shown a series of these water-bottles from the Museum collection. A is a natural gourd. B is the same, but has a wooden stopper and a rattan sling to hang it up by. These are called *labu ayer* ("water-gourd"), and are much used by the Malays.

Fig. C is a cocoanut shell with a wooden neck cemented on by *dammar*: it is called *labu sekua*. Figs. D, E, F and G, are earthenware bottles in the shape of gourds. These are called *labu tanah*. Fig. H from Upper Perak is also in the form of a gourd, but with a straight neck. It is called *labu puchang*. Fig. I has a flat in place of a round bottom. This and Figs. J and K are called *labu lichin* ("smooth gourd"), though the two latter have criss-cross and impressed ornamentation. Figs. L and M are modifications of Fig. H and are called *labu panai*. Fig. N departs a good deal from the original in having a well-marked foot, and an expanded lip to the neck. The remainder of the water-bottles are of the same type, but have raised vertical ribs; they are called *labu glugor*, the ribbing giving the body a slight resemblance to the fruit of the *glugor* tree (*Garcinia atroviridis*, Griff.). Two, Figs. P and R, have silver mounts and stoppers, and Fig. S has a wooden stopper and a silver band and chain.

The second type closely conforms to the shape of the cocoanut shell, and is used to hold water; it is called *glok* and *buyong*, according to shape and size. The rim is usually more or less deflected outwardly, and sometimes produced, while a foot is also occasionally added to the jars. Baskets of this shape are also to be met with; they appear to be derived from the same model. Malayan cooking pots are of the same shape, though they are rarely seen, the Indian pots being generally used.

Plate III shows these forms. On the top row are three cocoanut shell water jars. Fig. A has a rattan network round it, and a sling and cocoanut cover. Fig. B has no cover, but it is carved with vertical ribs representing a rattan net. These natural shell vessels are called *glok.*

Fig. D is an earthen jar called *buyong.* Figs. E and F are known by the same name, and have vertical raised ribs. Fig. C is much more globular in the body. Fig. H has a foot added, and is called *glok kaki.* Figs. I and J have compressed bodies, and are called *kapak.* Figs. K and L have globular bodies, and are called *glok.* Figs. M and N, which are from Upper Perak, differ a good deal from all the preceding, as the widest part is higher, and the mouth is not so produced; they are called *taker.* Figs. O and Q are cooking pots used to boil rice in; they are called *priok.* Fig. P is also a cooking pot, and is known as *blanga.* Fig. R is a censer; it is called *perasap.* Fig. S is also a sort of censer; it is used to burn sweet smelling herbs, etc., in for scenting clothes. Another form of censer is shown in Fig. G of Plate I. On the same Plate, Fig. F, is a steamer for cooking *pulut* rice (*Oryza Glutinosa*). It is placed over a *blanga* of water, and the steam rises through the holes in the partition; it is called *kukusan.*

On both types of water-jars, ribbed ornamentation is frequently met with, and this has its prototype in the rattan which is usually to be seen on cocoanut shell water-bottles and bottle-gourds, the plain rattan being represented by smooth ribs, and the plaited by criss-crossed ribs: the former almost invariably being placed vertically; and the latter horizontally. Criss-crossed incised lines often take the place of raised vertical ribs, and are evidently also derived from the rattan used on the natural vessels. It is held by many that these criss-cross lines, which are so common on ancient earthenware, arise from the earliest clay vessels being made by lining baskets with clay and then baking, so that the outside retained the impression of the basket-work, and that when this mode of manufacture was superseded, lines were traced to represent the impressions of the basket-work which existed on the earlier ware, in conformity with the well recognized factor that the human mind dislikes sudden changes of form in the development of any article.

While in no way wishing to doubt this explanation of the prevalence of the criss-crossed patterns ordinarily met with on pottery, it seems more probable, in the present instance, that they represent the rattan network so often found on the shell vessels.

Besides the raised and incised work already mentioned, many string patterns are formed by small wooden stamps, which are pressed into the clay while it is yet moist.

In Fig. 2 is shown a number of impressions from these stamps. Each potter has a set consisting of three or more rods. There are five of these sets in the Perak Museum. One from Bukit Gantang, two from Saiong, and two from Pulau Tiga. The V-shaped stamp occurs in each set. These stamps are generally used to form string patterns with often a dot, star, or other figure at the lower apex of each. Crosses of several types are also common, but the fylfot form is not used, though it is sometimes found on mat-work, silver-work, and cut paper designs.

One feature of Perak pottery is that none of the vessels have any handles, knobs, or other projections. The scarcity of cooking pots is also curious, though probably this is only because the imported Indian pots are stronger and cheaper than those of native manufacture. The two forms of Indian cooking pots have Malay names, which is rather strong evidence that the Malays possessed similar shaped vessels of their own, prior to the introduction of the foreign ones. Three of these cooking pots are shown in Plate III.

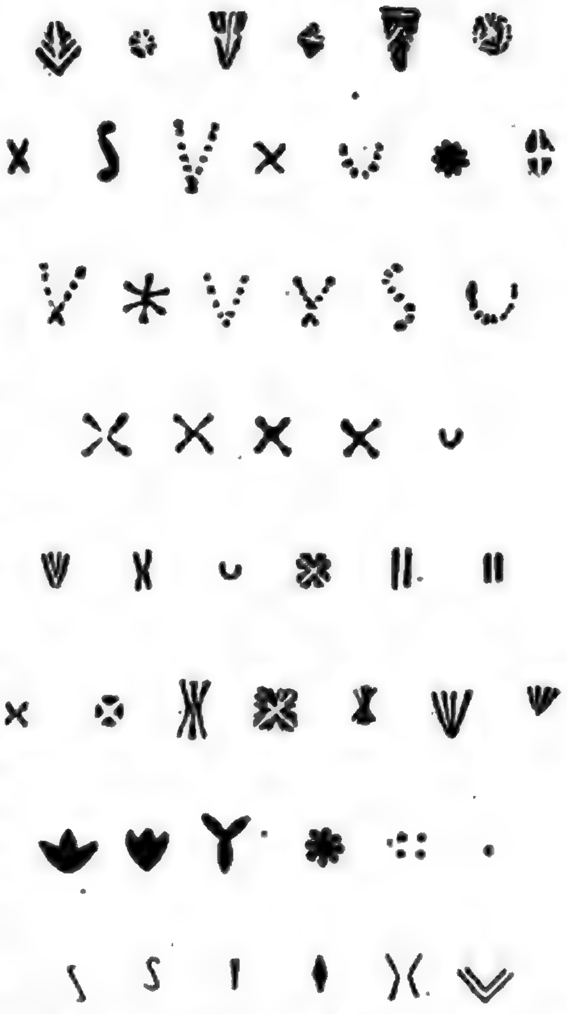


FIG. 2.—IMPRESSIONS OF STAMPS USED IN ORNAMENTATION OF MALAYAN POTTERY.

Explanation of Plates I–III.

PLATE I, 1.

Fig. A.	Mat basket to hold potter's tools.
„ B.	Cocoanut-shell cup for holding water, used by potters.
„ C.	Foot of a water-jar, first stage.
„ D.	„ „ further advanced.
„ E.	Body formed.
„ F.	Utensils for steaming *pulut* rice, called *kukusan*.
„ G.	Censer for burning incense, called *perasap*.
Figs. H to M.	Various stages of a water-bottle, M being the top half completed.
Fig. N.	A straight-necked water-bottle.
„ O.	A wooden turntable to make pottery on.
„ P.	Disc of wood to make pottery on.
„ Q.	Three bat shaped pieces of wood, to pat the clay into shape.
„ R.	Three bamboo knives to work the clay with.
„ S.	Top of a brass *sirih* box, and two pieces of bamboo, to burnish and smooth the ware.
„ T.	Stamps to make patterns on the ware.

Plate I, 2.

A female potter at work. Taken at Saiong, near Kuala Kangsar.

Plate II.

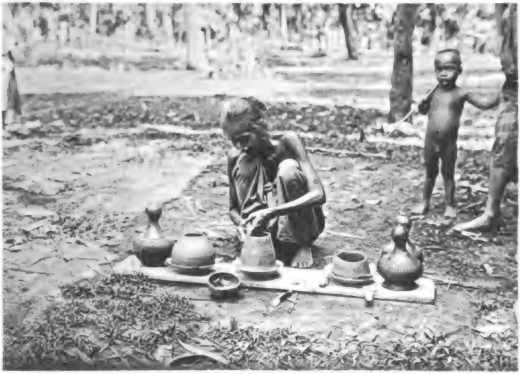
Fig. A.	A bottle-gourd used as a water-bottle, called *labu ayer* by the Malays.
„ B.	„ with wooden stopper and rattan sling to hang it up by.
„ C.	Cocoanut-shell water-bottle, with wooden neck cemented on with *dammar*, stopper, and rattan sling, called *labu sekua*.
„ D.	Earthenware water-bottle in the shape of a gourd. Made at Saiong Kuala Kangsar, called *labu tanah*.
„ E.	„ „ Made at Bukit Gantang, Larut.
Figs. F and G.	„ „ Made at Saiong.
Fig. H.	„ „ Called *labu puchang*. Made in Upper Perak.
„ I.	„ „ with modified bottom. Made at Pulau Tiga, Lower Perak.
Figs. J and K.	„ „ with criss-cross, and impressed ornament. Called *labu lichin*. Made at Saiong.
Fig. L.	„ „ with straight neck, and two raised rings and no ornament. Called *labu panai*. Made at Saiong.
„ M.	„ „ with globular body, a decided foot, and criss-cross, and impressed ornaments. Made at Saiong.
„ N.	„ „ with strongly marked foot, compressed body, and expanded neck. Made at Pulau Tiga.
„ O.	„ „ with body ornamented with vertical ribs. Called *labu glugor*. Made at Pulau Tiga.
Figs. P, R, and S.	Earthenware water-bottle mounted with silver. Made at Saiong.
Fig. Q.	„ „ Made at Pulau Tiga.
„ T.	„ „ Made at Bukit Gantang.

Plate III.

Fig. A.	Cocoanut-shell water-jar, with cover, rattan network, and sling. Called *glok*. Made in Larut.
„ B.	„ „ with carved lines representing rattan net. Upper Perak.
„ C.	„ „ with cover and string sling. Upper Perak.
„ D.	Earthenware water-jar. Called *buyong*. Made at Pulau Tiga.
Figs. E and F.	„ „ with raised vertical ribs. Called *buyong*. Made at Pulau Tiga.
Fig. G.	„ „ of globular form. Called *buyong*. Made at Saiong.
„ H.	„ „ with foot. Called *glok kaki*. Made at Saiong.
Figs. I and J.	„ „ with compressed body. Called *kapak*. Made at Pulau Tiga.
Fig. K.	„ „ with globular body. Called *glok*. Made at Saiong.
„ L.	„ „ with raised vertical ribs. Called *glok*. Made at Bukit Gantang.
Figs. M and N.	„ „ Called *taker*. Made in Upper Perak.
„ O and Q.	Cooking pots. Called *priok*. Made at Pulau Tiga.
Fig. P.	„ Called *blanga*. Made in Upper Perak.
Figs. R and S.	Censers. Called *perasap*. Made at Pulau Tiga.

Figures in the Text.

Fig. 1.—Outline map of Perak, showing the districts in which pottery is made.



2. FEMALE POTTER AT WORK: SAIONG NEAR KUALA KANGSAR.

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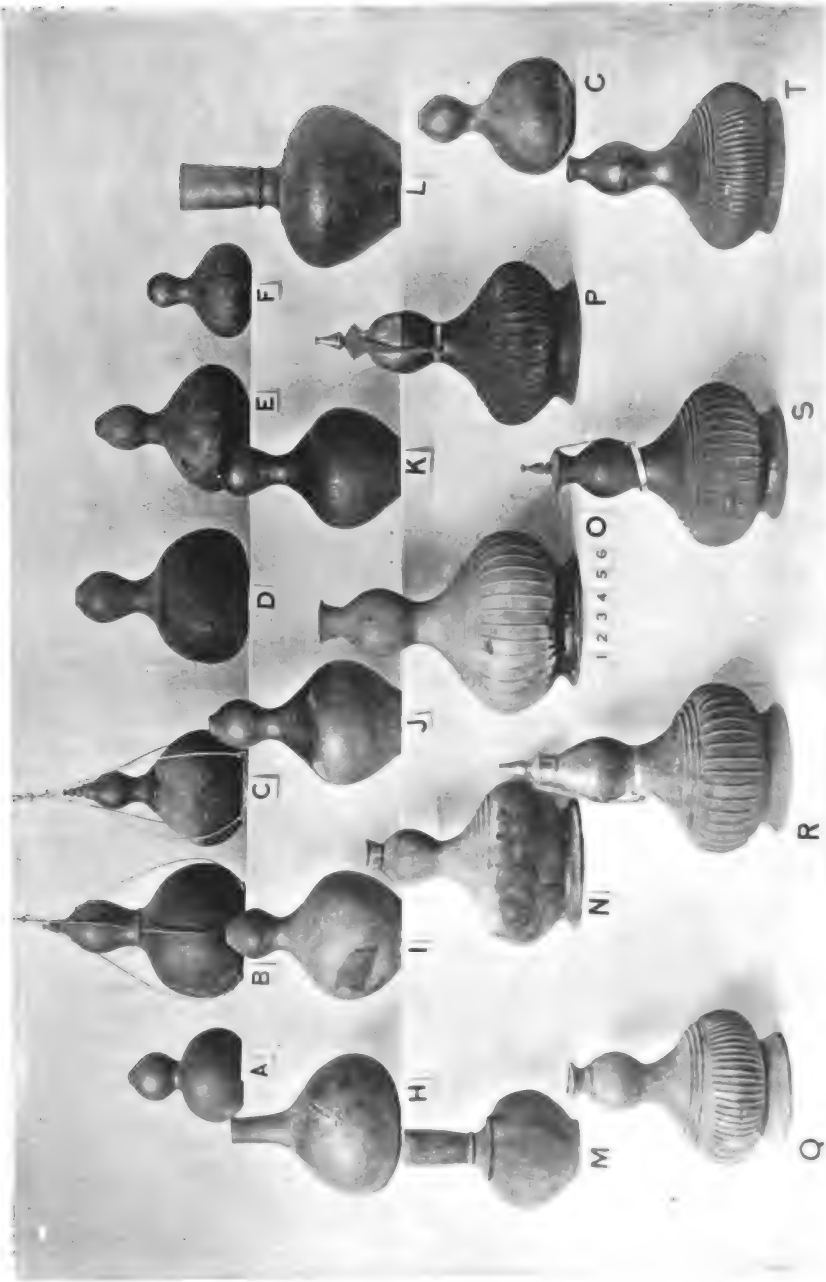
1. IMPLEMENTS USED IN MANUFACTURE OF MALAYAN POTTERY.

MALAYAN POTTERY OF PERAK.

Journal of the Anthropological Institute, Vol. XXXIII, Plate II.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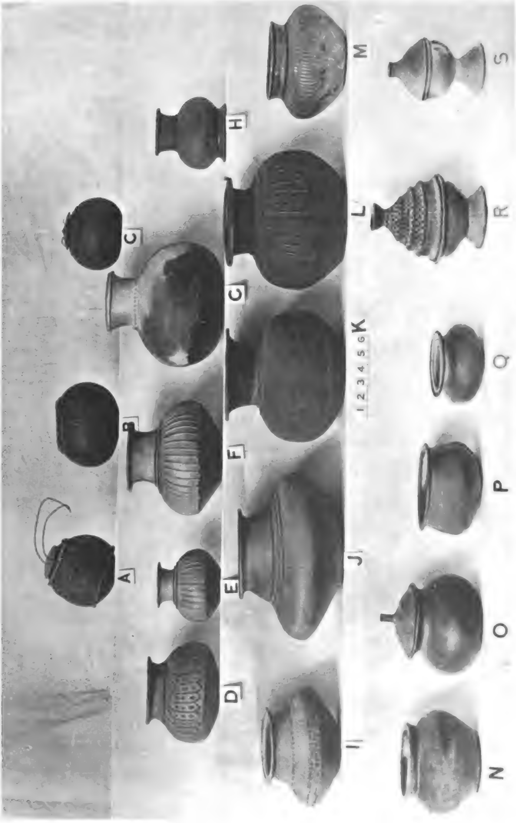
MALAYAN POTTERY OF PERAK.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MALAYAN POTTERY OF PERAK.

FIG. 2.

Line 1. Six impressions from a set of three wooden stamps, 7½ inches long. From Bukit Gantang, Larut.

„ 2. Seven impressions from a set of four stamps, 5 inches long. From Saiong, Kuala Kangsar.

Lines 3 and 4. Eleven impressions from a set of six stamps, 2½ inches long. From Saiong.

Line 5. Six impressions from a set of three wooden stamps, 5 inches long. From Pulau Tiga, Lower Perak.

„ 6. Seven impressions from a set of seven wooden stamps, 2½ inches long. From Pulau Tiga.

Lines 7 and 8. Twelve impressions copied from various pieces of pottery in the Perak Museum.

THE FUTURE OF ANTHROPOMETRY.

By Charles S. Myers, M.A., M.D.

[Presented January 13th, 1903.]

The attempt to predict the future of any science is only possible after a review of its past and present history. Fortunately as regards anthropometry, the stages which have marked its development are so well known that only a brief summary need be given here.

In the year 1799, Charles White, a Manchester surgeon, published the results of measurements made by him upon about fifty African negroes in order to determine certain differences between them and European peoples. Since then, an enormous amount of labour has been spent in collecting other measurements. The ratios of head-breadth to head-length, of nose-breadth to nose-length, of leg-length to thigh-length, etc., expressed as so many indices, have been determined upon individuals or skeletons from most parts of the globe.

The averages or means of series of indices obtained from one people have been compared with the averages or means obtained from other peoples. It is unnecessary here to point out the wide differences which have been found to exist for any one index among the different peoples of the world; how, for instance, the average cephalic index, which in the New Caledonian is 70, reaches 85 or more in certain districts of Central Europe, or how the average nasal index rises from 41·9 among the Esquimaux to 60·2 among the Bushman tribes.

A further step in the advancement of anthropometric research was made when attention began to be paid to the values of the individual indices from which these means had been calculated. It was observed, for instance, that a people, which gave an average nasal index of 57·9, contained individuals whose nasal index was less than 49 or greater than 68,[1] or that a people whose cephalic index averaged 77·5, yet contained individuals whose cephalic index was 66 and 85.[2] A study of the extent and frequency of such deviations from the mean was thus initiated. Binomial curves of indices were plotted out; but it was found that, instead of giving a plain, smooth, singly-crested line, they showed many varieties of asymmetry, and almost universally two, three or more peaks or modes. As each peak, of course, implied that individual indices were crowded in greater number at that point than elsewhere in the immediate neighbourhood, these peaks or modes were taken to represent types. Thus arose the art, which is still very widely practised, of dissecting out types from the indices obtained from a group of people, and of speaking, for example, of mesaticephalic, and of brachycephalic types co-existing in any one people under examination. This conception of types is implicitly founded on the hypothesis that at one time there existed races, each of which exhibited a separate type. And so, in consequence of the extreme and irregular variations of individuals from the mean or average of their people, has arisen the familiar modern dictum of anthropologists that at the present day no pure race exists.

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[1] Shrubsall, *Journ. Anthrop. Inst.*, 1899, vol. xxviii, pp. 100, 103.

[2] Topinard, *Eléments d'Anthropologie Générale*, Paris, 1885, p. 387.

Thus far has anthropometry progressed with the task of taking an average of every seemingly useful measurement on every people of the globe. Assuming that she has completed this task, what results has she obtained by her knowledge? Basing her faith in measurement as a sure means of ethnic identification, she has found the variation of individuals from the mean to be so wide, that again and again, even her ablest exponents have been grossly deceived in their attempts to identify ethnologically a bone or bones from the measurements by which the various forms and dimensions of bones are expressed.

It is small wonder that this has resulted in a hopeless distrust of anthropological measurements. Modifications of method have been vainly tried in order to improve this disappointing condition of affairs. One reason for the failure was held to lie in the complex nature of many of the measurements which had been chosen. It was said, for instance, that the comparison of maximum head-lengths among different races is absurd, since the maximum head-length is the expression of several independent variables, *e.g.*, the projection of the occiput and the prominence of the glabella. By another it was suggested that no two bones should be measured together, that the bones composing the skull, for example, should be individually measured, each, perhaps, from its own centre of ossification. Others affected to find the remedy in dispensing with indices, basing their conclusions on absolute measurements only.

There came also the well known endeavour of Sergi to banish anthropometry altogether from the department of comparative human craniology. By now, however, he shows signs of yielding the isolated position which he originally took up as to the utter worthlessness of indices, while he has induced most anthropologists to agree with him as to the ethnological value of the study of the configuration of bones. Need it be urged how mischievous is such an attempt to replace linear or angular measurements by a study of outlines, if based upon the expectation that mathematical considerations may be thereby ousted from physical anthropology? To judge of an outline of face or skull by the eye, to set it down as beloid, ellipsoid, or what not, is to foster an utter lack of reliability in anthropometric results. For a very short experience of Sergi's methods is sufficient to prove how, in practice, the various forms described by him shade insensibly into one another. If we are to know the degree of nearness or of remoteness borne by each skull or bone to the type-forms, is it not clear that these various forms must be expressed in mathematical language? Outlines, of course, are not as simply amenable as lengths and breadths to numerical representation, but that they are ultimately so amenable must be obvious to every one after a moment's consideration. Indeed, if physical anthropology is to be a science, its results *must* be capable of expression in mathematical formulæ. To this end some of the most interesting of the biological work of the age is trending. The traveller and the student of natural history have had their day. I do not mean to deny that species, varieties, and histological, embryological, and physiological phenomena still await description in the old picturesque fashion. But, generally speaking, the study of living forms is passing from the descriptive to the quantitative aspect, and it is by experiment and observation on biometrical lines that future progress is clearly promised.

In reality, the disrepute into which anthropometry has thus fallen, is very largely due to the perpetuation of methods that cannot be too strongly nor too often condemned. Example after example might be taken where a single average index, obtained from a handful of skulls of one people, is fatuously compared with the average index of the skulls of another people, in order to obtain proofs of ethnic relationship. But I would not for a moment have it supposed that I am here blaming craniologists and travellers for publishing small series of measurements. More data are precisely what is wanted, if they be carefully gathered by means of accepted methods. What we do not want, what has been done more than anything else to bring about the general discredit that embarrasses anthropometry at the present day, is the false reasoning from such slender premises. Let the collector of small material set forth his contribution, but let the material bide its time until sufficient has been collected to serve as a reasonably secure basis for conclusions.

A very slight acquaintance with statistical methods is adequate to convince any one that the already mentioned dissection of a series of indices or measurements into groups or types is apt to be an unwarrantable and fallacious proceeding. The figures obtained in anthropometric work will range themselves about two or more numbers, not only orderly and significantly, because the material of the series is composed of distinct heterogeneous elements, but also accidentally and at random, because the series is numerically insufficient to give a smooth singly-peaked curve. There can be little doubt that most of the many-peaked curves owe their irregularity to the inadequate number of individual measurements which have been taken. A very extensive series, the sufficient size of which can only be determined by statistical methods, must be investigated before deductions of ethnic relationship can be legitimately made.

We return to consider the statement that no pure race exists at the present day. The question at once occurs to us, has a pure race ever existed, and, if so, what are the criteria of racial purity? Take the earliest people of which we have any trustworthy knowledge, the prehistoric Egyptians who lived before 5,000 B.C.; are they a pure race? Those who admit the vast remains sent home by Professor Flinders Petrie from Naqada to represent the people of a single epoch, will turn in vain to Mr. Warren's[1] and to Miss Fawcett's[2] recent memoirs, if they expect find that the variation of these Egyptians from the mean type is very considerably smaller than what is met with among modern peoples. Or is the Long Barrow race of Great Britain pure? Dr. Garson, at least, has been able to divide them into two groups. If, on the other hand, racial purity is, and always has been, merely relative, the question suggests itself, to what extent do the members of a fairly pure and of an extremely mixed race differ in the deviation of their skeletal characters from the mean? What, for instance, is the difference in the mean variation of stature between the neolithic Long Barrow men and the Englishmen of to-day? Until of late years, no attempts have been made, save by idle speculation, to solve this and similar problems, which are at the very basis of ethnological arguments. Instead of recognizing that there is hardly any measurement which is not important in questions of racial diversity and relationship, provided that it be used intelligently, people have so far been searching vainly for the philosopher's stone, the ideal test, the infallible measurement. Thanks to the recent work of Professor Karl Pearson, the proper start has at last been made, and it is to be hoped that before long a larger body of workers will appear in the field and considerable headway be gained.

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[1] *Phil. Trans.*, vol. clxxxix, pp. 135-227.

[2] *Biometrika*, vol. i, 1902, pp. 408-467.

I would suggest that anthropometry might gain by the inauguration of a new study, anthropoidometry. Investigations might profitably be made on some one of the anthropoid apes, and the variations in head and stature measurements, for instance, might be compared according as the apes come from the same, or from different, regions of the world. Indeed zoometry is in the future to be looked on as a valuable helpmate to anthropometry. The study of the variation of offspring under new conditions of climate, and their comparison with the earlier stock, can be made far more accurately upon animals, and the general principles, therefrom deduced, be later confirmed or modified in their application to mankind.

A further study which is beginning to engage attention is the dependence of the variation of one character upon that of another. No one supposes that a dark skin is the *sine quâ non* for acclimatization to tropical condition; the increased pigmentation appears to be correlated with certain unknown physiological changes by which that end is attained. So it is with other variations in bodily form. A greater head-breadth is doubtless correlated with a diminished head-length, a greater head-length with a longer face-length, a greater head-height with a diminished head-breadth, a larger set of teeth with a more projecting jaw, a taller stature with an altered ratio of the length of thigh to length of shin. But we have yet to discover how far such correlations vary in the case of different peoples.

We shall some day have material sufficient to determine the evolutionary changes undergone by a people fixed in a given country. The attempt has already been made for Egypt and Great Britain.[1] If the results are accepted,[2] they show the possibility of extraordinarily rapid alterations within a comparatively short space of time.

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[1] *Biometrika, loc. cit.*, p. 433.

[2] See however, *Man*, 1903, 13.

We have also to study the effects of cross-breeding between the various peoples of the globe. Anthropometry has yet to determine to what extent the offspring is fertile, how far the characters of the parents are inherited, how often they are blended, or are alternative (*i.e.*, exclusive), whether the characters of one parent are ever irretrievably lost (the so-called false hybridism of Millardet), whether the offspring ever exhibits totally new characters, and how far such diverse characters of the offspring are permanent.

Through the initiative of Mr. Francis Galton, anthropometry has begun to investigate other problems which must ultimately be of ethnological interest, *e.g.*, whether dark-eyed or tall women bear more children than the fair-eyed or short, whether brothers are more alike than sisters, whether inheritance is more marked in the male or in the female. We have here opened out the whole subject of heredity which ultimately must enter into every branch of physical anthropology. Those who are familiar with the various claims of Mendel and his successors will recognize what a wide field of research is here possible. Into this province I cannot attempt to enter. So much must first be settled by zoologists who can work under simpler and experimental conditions, before anthropometry can profitably apply herself to the subject.

Indeed, turn which way we will, we see that ultimately anthropometry must ally itself with the study of the measurements of other living forms. Biometry is at present in its infancy. It has the advantage of seeing into what errors its elder sister Anthropometry has been led by arguments based on insufficient data. In the future we may behold one united science concerned in the quantitative investigation of the phenomenon of life.

Along what lines this investigation will go I have attempted to sketch out to you. If in so doing I have been able likewise to indicate the present pitfalls which are to be avoided, and some of the main directions in which, at this moment, anthropometry may profitably be employed, I shall feel that I have not laboured in vain. Anthropometry has become well nigh sterile by its persistence in one sole line of research after racial averages. Its activity can only be revived by the infusion of new blood, the adoption of improved methods, the pursuit of new problems. The collection of sufficient material is open to all who are possessed of the requisite patience and accuracy. Accuracy can only be obtained by faithful obedience to agreed bases of measurements, and by such reductions of the personal equation as may be brought about by occasional meetings of those engaged in anthropometric work in order to discuss and actually to compare their several procedures. The subsequent treatment of the material may require a mathematical and statistical training, the opportunities for which, although even now presenting little difficulty, must as surely increase in the future as the demand for them will surely become greater.

A RECENT DISCOVERY OF PALEOLITHIC IMPLEMENTS IN IPSWICH.

By Nina Frances Layard.

[With Plates IV, V.]

A prolonged search for paleolithic implements in Ipswich resulted, in March, 1902, in the discovery of a pit which has yielded a large number of well-worked specimens.

Up to this time, with the exception of one or two implements found in connection with remains of mammoth, rhinoceros and *Bos primigenius*, no trace of man's earliest handiwork had revealed itself. These occurred in the low-lying valley gravels in Russell Road, a site on which the late Dr. Taylor of Ipswich had previously found them.

The first indication, however, of implements belonging to a higher level was the discovery of a large early paleolithic hatchet in Levington Road, at a considerable height above the estuary of the Orwell. This was in January, 1900, and it came into my possession a year afterwards, when the trench from which it was taken had been long closed. Following up this clue, after careful enquiry, I was directed to a brickfield at about the same altitude, which has yielded numerous implements, the surface level at this point according to the nearest bench mark being 120 feet. By the kindness of the owner, I have been given every facility for working in the pit.

On a first visit to the spot on March 21st, 1902, several implements were obtained, two of which I picked up myself. Thanks to the intelligence of the foreman, the "fighting stones" had been recognized, and thirty good examples have now been taken from an area not exceeding 53 feet by 30. To describe them is the object of this paper. They were found at depths varying from 7 to 12½ feet, some of the most elaborately worked being at the greatest depth.

Among them there are sixteen distinct forms, evidently shaped for a variety of purposes, a few of which have been photographed. Pointed implements largely predominate, one only out of eleven examples having the butt end sharpened (Pl. V, Fig. 2). As this is painful to hold in the hand, it is difficult to see how the tool could have been used unless hafted. This beautiful implement, which must have been acutely pointed, and is remarkably symmetrical in outline, was lying close beside another of much rougher workmanship, and not sharpened at the butt; incidentally showing how superior and inferior implements may belong to the same period. Of the rest all the pointed implements are conveniently humped for holding, and one has the butt smoothly worked to remove irregularities. On some of the others the crust is partially left.

The clumsier of the tools would appear to have been specially fitted for agricultural purposes, the weight of the butt giving more force to a downward than a forward blow; but a more delicately fashioned weapon, which is sharpened to a thin blade, so that the edge is transparent when held up to the light, would well have served the purpose of a spear-head.

The vexed question as to the hafting of Paleolithic tools may perhaps again be considered open to discussion in view of three implements, which have been apparently shaped for this purpose. Two of them are exceptionally fine and delicately worked, and have a glossy patina (Pl. IV, Figs. 1 and 3). The third is smaller, with an equally defined depression, as if for the haft. They appear to have been double-headed implements, the thicker half being rounded and sharpened to an edge, and the other half sliced to a thin blade. In the specimen shown on Pl. IV, Fig. 3, the blade has been broken. It is possible that the sliced end was so fashioned to be thrust into the wood which formed the handle, thus giving greater security before it was bound on.

When implements are humped, perhaps it is needless to question whether they were put into handles, for the hump is to give a hand-grasp, but for most flat implements, a handle would appear to be necessary.

A tool which is of an oval form, small and thick, is worked but not sharpened, I will hazard no conjecture as to its use. The borer (Pl. V, Fig. 1) closely resembles those described by Sir John Evans and Mr. Worthington Smith. A clever screw-like turn has been given to the upper part of the blade.[1]

For another tool which is pear-shaped, and fits well into the palm of the hand, it is difficult to suggest a use.

The beautiful heart-shaped implement (Pl. V, Fig. 4) is thickly covered with an ochreous patina. There is an example of a similar form in the British Museum, from Coussay-les-bois.

Comparing the two implements which are seen on Pl. V, Figs. 2 and 5, it is interesting to notice that the direction of the hump suggests the mode of use. In one (Pl. V, Fig. 5) the hump extends as a ridge along the middle of the flint lengthwise, and when balanced in the hand, it is easy to recognize that the implement, which is a scraper, must have been used sideways, and in the other (Pl. V, Fig. 2) the hump is at the butt, suggesting that the sharpened end of this implement was used. I have other examples of each of these forms. In both, the under side is flattened, which would fit them for scraping the fat or hair from skins without cutting them. In the latter example (Pl. V, Fig. 2), the edge is wonderfully keen, as though it had scarcely been used.

Perhaps no implement in this collection shows finer work than the somewhat flat crescent-like form of which I have two specimens (Pl. V, Fig. 6). The perfection of the cutting-edge, when viewed in profile, is remarkable, as well as the symmetry of outline when seen edgewise.

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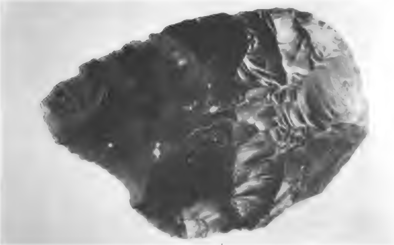
[1] I have succeeded in boring a hole through hard wood with this implement, which is still sharp.



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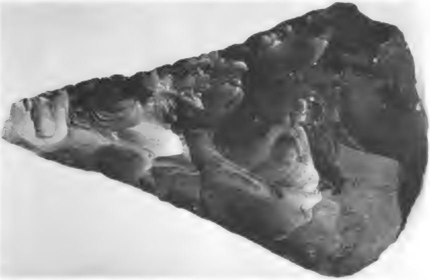

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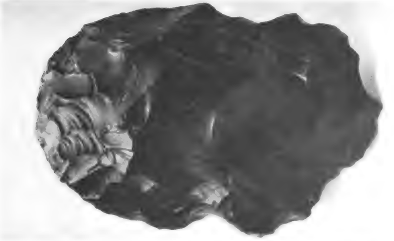

3.

PALÆOLITHIC IMPLEMENTS FROM IPSWICH.

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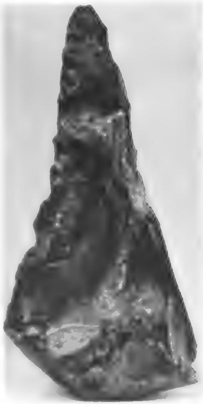

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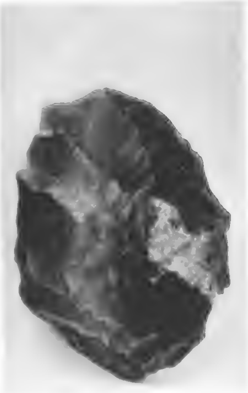

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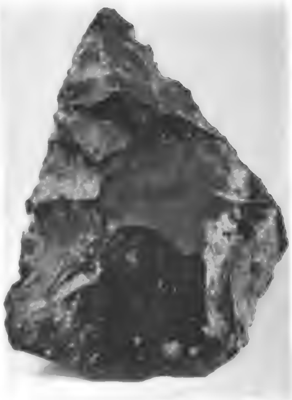

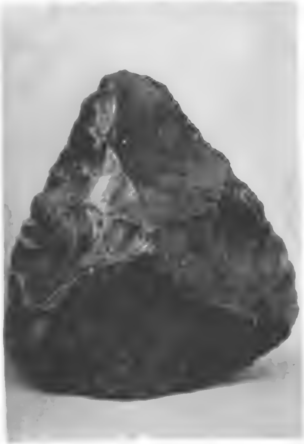

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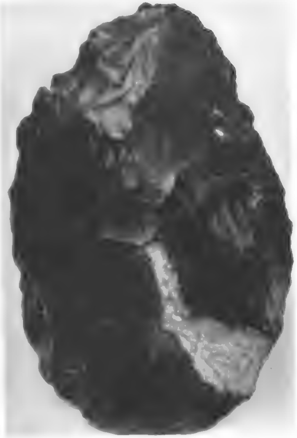

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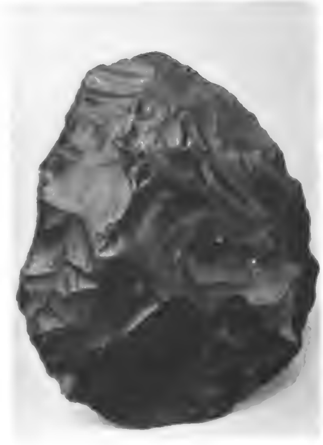

6.

PALÆOLITHIC IMPLEMENTS FROM IPSWICH.

Another specimen (Pl. V, Fig. 3) is of a flat triangular shape, worked on one side only, and broken. Similar implements are to be seen in the British Museum, from Coussay-les-bois and Stoke Newington Common.

A chisel-like form might well be a forerunner of the neatly worked Neolithic chisel, but although this tool is regarded as distinctly Neolithic by several experts who have seen it, it was found in the same section, though at exactly what level I am unable to say.

Unfinished implements are often met with on Paleolithic sites, and a good example of the kind was found in this pit.

Of animal or vegetable remains there is unfortunately little to show. The tip of a tine, a fragment of bone, and a portion of Rhinoceros tooth is all at present obtained. A small rude drinking vessel, hand-made, and roughly ornamented, was taken out at a depth of 6 feet on the border of the section, but this was in a more recent deposit, and had no connection with the flints. An identical vessel may be seen in the Ipswich Museum, and another, almost exactly similar, from Felixstowe, is in the British Museum.

NOTE ON MISS LAYARD'S PAPER.

BY CLEMENT REID, F.G.S.

MISS LAYARD's paper records the discovery at Ipswich of another silted-up valley, cut out of the boulder-clay plateau of High Suffolk. The implements from Ipswich, though so closely resembling those from Hoxne and Hitchin, include two or three forms unrecorded from those localities.

Though the Ipswich, Hoxne, and Hitchin implements come from high-level deposits connected with the so-called "plateau-gravels" of Suffolk and Herts, there is nothing to connect these plateau-gravels with deposits containing implements on the high plateaus of Kent. As applied in the Geological Survey maps, the term "plateau-gravel" only refers to the relations in the immediate neighbourhood, and a plateau gravel of one district may pass into a high-terrace gravel in a more hilly area.

The Ipswich section is so much dug over or overgrown (though the part where the implements are found is perfectly clear and undisturbed), and the locality is so cultivated, that it would be very difficult to work out the exact relations of the various deposits, as was done at Hoxne and Hitchin. The implement-bearing brickearth and gravel at Ipswich occupies a slight depression in the plateau, this depression, as at Hoxne and Hitchin, marking the course of a deep channel which has been silted up nearly level with the surrounding plateau. I feel sure that the brickearth and implements are newer than the boulder-clay, for the brickearth near its base is full of washed and reconstructed boulder-clay material. A mass of boulder-clay, seen in another part of the pit, was surrounded by gravel, and was probably part of an old landslip from the sides of the channel. The occurrence of such slipped masses of boulder-clay probably gave rise to the impression that this brickearth was of older date than the boulder clay (as is shown on the Geological Survey Map).

IRISH FLINT ARROW- AND SPEAR-HEADS.

By W. J. Knowles.

[With Plates VI-XIII.]

Origin.

Palæolithic implements show considerable variation in form. They are often leaf-shaped, and, in their outline, very like some arrow-heads found in Ireland and elsewhere. If we treat the Palæolithic and Neolithic periods as continuous, I believe we can show a graduated series of implements, beginning with the largest palæolithic examples, and ending with the smallest neolithic leaf-shaped arrow-heads. The palæolithic implements themselves were not all large. Some were so small that they could have been of little use as implements if held in the hand, but would have been very useful, mounted as spear-heads.[1] In Plate VI are figured a few small palæolithic objects in my own collection from the south of England, France, and Somaliland, and though these were not selected for the sake of variety of outline, but solely to show smallness of size, yet if the outline of some of them is compared with neolithic arrow-heads (Plates IX and X), in some cases almost identity of form will be observed. For example, compare Plate VI, Fig. 1, with Plate X, Fig. 41, and Plate VI, Fig. 4, with Plate IX, Fig. 28. The later implements will be found to be thinner, and more finely chipped than the earlier kinds, but if we take in a long period, and grant continuity, the gradual descent of the small and finely worked from an older series of implements, that are large and show coarser work, seems quite natural. Plate VI, Figs. 1 and 4, are from Côtes-du-Nord, France, Fig. 2 from Wandsworth, and Fig. 3 from Warren Hill, England; Figs. 5 and 6 are from Somaliland, part of the collection of Mr. H. W. Seton-Karr. These latter may be called neolithic by some authorities, but they have the same appearance, as regards weathering and style of workmanship, as the larger implements from the same collection; and I have, therefore, no hesitation, as regards age, in putting the large and small in the same class.

In later palæolithic times we find that the implements had become more highly developed, showed more variety of form, and were at the same time thinner and more finely worked than those in use early in that age. These have a greater

[1] See *Musée Préhistorique*, Plate VIII, Figs. 41, 44 and 46. See also Plate X, Fig. 56.

likeness to neolithic implements found in Ireland than the earlier kinds. I have elsewhere pointed out the likeness of many spear- and arrow-heads, and also of other objects, found in Antrim and the adjoining counties, to implements described as "Mousterien" and "Solutrien" by French archæologists.[1]

Flakes came early into use as tools and implements. The first flakes must have been those struck off in the manufacture of large implements; they were mostly short and broad, and similar forms were often repeated. The manner of making flakes into implements was by a slight dressing round the edge, the more pointed kinds forming the Mousterien *pointes*, and the more rounded kinds, the *racloirs*. In Ireland, similar flakes are made into the same kinds of implements, and the Solutrien form of spear-head—the laurel-leaf—is also not uncommon among the Irish neolithic flint implements; the large-pointed flake very often assumes the peculiar six-sided shape of the laurel-leaf implement, and, by slightly dressing round the edges, a perfect spear-point is formed. Many of the larger implements of this kind have, however, been made from boulders, and some show very fine workmanship. As I have pointed out in the paper referred to, I hold that there is a relationship between palæolithic implements of the kind described, which have been found in the south of England, in France, and Belgium, and those of the Neolithic age found in Ireland.

But with no Palæolithic age in Ireland, and with the acknowledged gap between the Palæolithic and Neolithic periods in England, Belgium, and the north of France, how are we to find continuity between the older and newer implements? Dr. James Geikie, I believe, gives the best explanation of this difficult problem. In *Prehistoric Europe* he holds that man was an occupant of our continent during glacial and inter-glacial times, and he answers those who object to his views by saying: "They tell us that Palæolithic implements occur in certain deposits that overlie the great chalky boulder-clay in Norfolk and other places, and these deposits are recognized by them as of post-glacial age, simply from the fact that they rest on boulder-clay. Now this conclusion would be inevitable, if it were true that the great chalky boulder-clay had been laid down during the last glacial epoch. If that were the case, no one could dispute their contention that Palæolithic man lived in England in post-glacial times. . . . We know now, however, that during the Glacial Period arctic and genial climates alternated, and that the great chalky boulder-clay is not the *Moraine profonde* of the last glacial epoch, but belongs to a much earlier stage in the series."[2] This view of the case seems to be supported by Mr. Clement Reid, F.G.S., in his *Origin of the British Flora.* He says: "We know that this Pleistocene Period was characterised by more than one wave of intense cold, which, for a time, must have profoundly modified the fauna and flora of Britain. It was also marked by milder intervals, sufficiently long for the temperate plants to reappear, and also by a period of drought, which brought the fauna of

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[1] "Survivals from the Palæolithic Age among Irish Neolithic Implements," *Proc. Roy. Soc. Ant. Ireland*, vol. vii, Ser. 5, p. 1.

[2] p. 360.

Central Asia into continental Europe, and, in a minor degree, affected the climate of Britain. Man first appeared in Britain during the latter half of the Pleistocene Period; or rather, we should perhaps say, we have as yet no satisfactory evidence of his earlier incoming."[1]

Dr. Geikie describes how man may have hunted the reindeer in Southern England, Belgium, and Northern France for many generations before the increasing severity of the climate compelled both to retreat. "Step by step, however, man was driven south, England and Belgium were deserted; perhaps even Germany down to the foot of the Alps was left unoccupied, until at last the Palæolithic race or races reached the south of France."[2] No doubt this region was not previously uninhabited, and there would be other peoples to go still further south to the shores of the Mediterranean and Northern Africa,[3] and I believe it is in those regions we must look for the development of the neolithic stage of culture from the palæolithic. Possibly Sergi's Mediterranean race would have its origin at this time. After the passing away of the glacial period, the fauna and flora would move northwards, and man would follow the game. The long lapse of time from the retreat southwards till the return to the north would represent the hiatus in Northern France and Southern England, but I believe we can find continuity in the implements, if we follow man southwards, and return with him northwards after the passing away of the glacial period. Seeing the advance made in the development of implements from the earliest part of the palæolithic age to the times known as Solutrien and Magdalénien, a further development is quite natural. From the polishing of bone there would follow the polishing of stone weapons. Other improvements would be introduced in the course of time, such as we find have taken place, but if we contrast and compare a whole set of the older implements with a whole set of the newer when the development is complete, we find that there is not a greater difference than we should expect. Much that is new has been introduced. Many old things have undergone improvement, but many old forms continue almost unchanged. We find that the neolithic axe is often no more than a palæolithic implement of longish shape, ground to an edge at the broad end, while objects like the rude *coup de poing* are sometimes found in factories of neolithic age. The Mousterien *pointes* and *racloirs*, as well as the laurel-leaf spear-head and other Solutrien forms, are quite common among neolithic implements, and many of the newer arrow- and spear-heads show only very slight variations from the older implements.

It will be seen from the foregoing argument that I derive the neolithic implements from those of the palæolithic age. It also follows that the neolithic period commenced with the return of man to the north after the glacial cold had passed away.

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[1] pp. 36, 37.

[2] *Op. cit.*, p. 354.

[3] Some may even have gone to South Africa, *e.g.*, the steatopygous race.

MANUFACTURE.

The method of manufacturing arrow- and spear-heads in prehistoric times is largely a matter of conjecture. The way in which modern savages have made nearly similar implements is interesting and suggestive, though the accounts of their methods of manufacturing flakes and arrow-heads show that scarcely two tribes followed the same plan. Many archæological writers have given more or less information on this subject, but Sir John Evans gives copious extracts from the writings of eye-witnesses regarding the way in which American tribes, the Eskimos, and the Australians manufacture their flakes and spear-points.[1] Mr. Gerard Fowke also gives short accounts of the modern method of manufacturing flakes and implements, quoting largely from Evans.[2]

A short summary of various methods employed, selected from the writings of these authors will be sufficient for my purpose. Flakes were produced by pressing a T-shaped piece of wood against a core of obsidian, the lower end being pressed firmly against the core, and the cross-piece against the breast; by hard pressure a flake would fly off. If the crutch-like piece is tipped with walrus tooth, or bone, and pressure used in the same way, a similar result would follow. Some of the methods of flaking, observed among American tribes, are by laying a bone wedge on the surface of a piece of obsidian and tapping till the stone cracks; by using a punch of deer's horn, which would be struck by a stone or wooden mallet; by placing a stone for an anvil on the knee, holding the core on it, and striking off flakes with a stone hammer; and by heating, when the stones break easily. The Eskimos produce flakes of chert by slight taps with a hammer formed of a very stubborn kind of jade or nephrite. Evans describes one such hammer which he has seen. It was "oval in section, about 3 inches long, and 2 inches broad, and secured by a cord of sinew to a bone handle, against which it abuts. The ends are nearly flat." He adds that "it seems doubtful whether the proper use of these hammers was not for crushing bones."[3] The native Australians produce flakes by striking the core, from which they are to be detached, on a larger block.

In making arrow-heads, the flake is held in the left hand, and a punch, made of the tooth of a sperm whale, is held in the right hand, and struck with a wooden mallet by an assistant; the flake is turned, and the process repeated, till the arrow is complete. A second method of manufacture is to take a piece of obsidian in the left hand, and press it firmly against the point of a small goat horn, held in the right hand; by moving it gently in different directions, small flakes are chipped off till the arrow is complete. Sometimes a notch is made in the end of a bone, into which the edge of the flake is inserted, and a chip is broken off by a sideways blow. Another method is to set the flat side of a flake on a blanket, or other yielding substance, and nick off the edges rapidly with a knife. The Eskimos sometimes set the flake in a piece of split wood; the arrow is roughly chipped by blows with a hammer, either direct, or with a punch interposed, and is then finished by pressing off fine chips with a point of antler set in an ivory handle. The Eskimos also make a spoon-shaped cavity in a log, lay the flake over it, and press along the margin, first on one side, and then on the other, as in setting a saw, until they form two sharp serrated edges. In addition to the various methods of manufacture mentioned above, which are only a selection from a larger number given by the authors I have mentioned, we have accounts by competent witnesses of the production of flakes for gun flints, and the manufacture of the gun-flints themselves.[1]

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[1] *Ancient Stone Implements*, 2nd Edition, p. 23.

[2] *13th Report of the Bureau of Ethnology*, Washington, p. 139.

[3] *Op. cit.*, p. 25.

The above accounts will help us in forming an opinion in regard to the way in which ancient flakes and arrow-heads were formed. Assistance in coming to a right conclusion may be obtained from a careful study of the ancient implements themselves. The case may appear still clearer if the chipping of flint is practised, as has been done with advantage by many antiquarians. I have tried this plan myself, and have also witnessed the modern forger at work, and heard from him accounts of how some articles, which he regarded as evidence of his highest skill, were made. On one occasion, he made an arrow-head in my presence by means of a fabricator of basalt, selected from recently spread road metal. He placed the flake in a fold of his coat near the breast, and pressed round the edges of the flake with his rude fabricator, shifting the position of the flake from time to time, and, in less than half an hour, produced a very well formed arrow-head of the stemmed and barbed class. One would expect that the barbs would be the most troublesome to produce, but, if the fabricator has a thinnish edge, I know from experiments made by myself that the hollows separating the barbs from the stem are not hard to make, if pressure is strongly applied to each side alternately. The English forger can show even better work than his Irish brother in trade. I have some arrow-heads of glass and flint from England, given me by a friend, which show chipping all over the surface like ancient work. I was informed that the fabricator used in pressing off the flakes by this workman was the ivory handle of a lady's button-hook. My son has brought me spear-heads, made out of bottle glass and telegraph insulators by modern native Australians, which show chipping quite equal to that on ancient flint arrow-heads. He has also brought me some glass spear-heads, made by himself in imitation of the Australian ones, which are cleverly made, but he has done everything by striking with a hammerstone, and nothing by pressure, and, therefore, his work is not so fine as that of the native Australians.

When we examine our Irish flint implements,—not the good and picked articles, but the good, the poor, and the broken, just as they occur on some site of a manufactory,—we gain a considerable amount of information. We find that the rough material consisted almost entirely of pebbles, or small boulders of flint which had been rounded by long-continued rolling on the sea beach. As a rule, the first thing done by the ancient workman was to break one of these pebbles in two. The break was a clean fracture nearly in the centre, and from this fractured face, flakes were struck off in the direction of the end of the pebble. In sites where flint implements were manufactured, are found rounded boulders of quartzite, or other tough rock, with pitted hollows on one or both faces; these are supposed to have been anvil stones, on which the cores rested when flakes were struck off by other rounded stones, bruised on the ends, called hammerstones. At Whitepark Bay, where flint implements have been largely manufactured, chalk cliffs are seen all around with flints sticking out of their faces, and there are numerous flint boulders which have been weathered out, and are lying at the base of the cliffs; yet these do not appear to have been employed to obtain flakes, and quarrying does not seem to have been resorted to. Splitting the water-worn pebbles, and then making flakes out of each half, was the rule, though a small pebble might be unequally divided, and, in that case, the large portion only would be turned into flakes. I have seen small pebbles that have had one flake or portion struck off from one end in a slanting direction, then another from the other side, also slanting, and so on from each side alternately.

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[1] Skertchly, quoted by Evans, *op. cit.*, p. 18.

Arrow-heads were made chiefly from flakes. As evidence of this, in many specimens, even when highly finished, some traces of the bulb of percussion, or of the ridge, or ridges, along the back are found. I have examples which show the ridge in an undressed state, even after a stem or barbs have been formed. Plate VII, Figs. 7, 8 and 9, shows specimens of flakes made into three different forms of arrow-heads. Fig. 7 is leaf-shaped, Fig. 8 stemmed, and Fig. 9 barbed without central stem, all showing the central ridge of the flake, the chipping being confined to the edges in Figs 7 and 8, and to the point and barbs in Fig. 9. These seem to have been good and effective weapons as they are; but we find other examples only partially made, which may have barbs well made, but the points unfinished, and in other cases show the completed points with unfinished bases. There are also arrow-heads which have been fairly finished at both point and butt, but which are so crooked that we cannot see to what use they could be put; yet if they are to be regarded as failures, one would have expected the workman to reject them before bringing them to the condition of finished implements. Possibly they may have been useful as knives. We can see, by examination of specimens, that the bulb and the curve in the flake always gave trouble to the workman, and also the great efforts that were made to neutralize these by extra chipping in one part, and little or none in another. In a few arrow-heads and other implements, an unchipped projection or burr is left in the centre of one of the faces. It evidently could not be removed by the flaking tool, yet, notwithstanding this defect, such implements would appear to have been brought into use.

I have a series of rude flint objects which I believe are not spear- or arrow-heads, but rather implements of that kind in process of manufacture. They are rudely dressed or blocked out objects of oval or ovate form, the flaking on which must have been produced by blows from a hammerstone. Some have been made from pebbles or boulders of flint, and others from large flakes or spalls. They are too rude for implements in the present state, and, therefore, I believe they must be blocked out spear- and arrow-heads which were intended to be brought to a finished state by the flaking tool. No hoard of these blocked-out implements, so far as I know, has been found in Ireland, and I am not aware of their having been observed or noted by collectors.[1] I have the habit of putting articles having similar peculiarities together, and now after many years collecting, I find that I have over 200 of these objects. They come from various well known sites, Whitepark Bay, Portstewart, Glenhead, Glenleslie, and other sites along the valley of the Bann and Braid. In America, Mr. W. H. Holmes has found around Washington places where the gravels had been excavated in times past by American tribes in order to find boulders of a good and suitable quality to chip down into rude leaf-shaped blades, not for use as implements, but for carrying away to other sites, where they would be manufactured into spear and arrow points.[2] Sir John Evans mentions in his *Ancient Stone Implements and Ornaments* a find of thirty-four such rude objects as the Irish specimens I have mentioned, at Old Deer, Aberdeenshire.[3] Dr. Munro, in his *Prehistoric Scotland*, also mentions a find of thirty-four such objects at Skelmuir, Scotland,[4] and Dr. Joseph Anderson writes on "A deposit of flint, worked to a leaf shape, found at Bulwark, Old Deer, Aberdeenshire." The finds mentioned by these three authors appear to be one and the same, and, judging from the figures shown in Dr. Anderson's paper, and those of the American blades accompanying Mr. Holmes's report, I should think the rude Irish objects, which I have brought under notice, are similar in kind to the Scotch and American examples, and show a stage in the manufacture of a finer type of implement. Dr. Anderson sums up in his paper:—"We have here the material, partially manufactured, roughly blocked out for arrow- and spear-heads, and apparently so treated that they could easily be transported to a distance." In Plate VII, Figs. 10, 11, 12 and 13, are shown four of the Irish specimens. Portions of the crust of the original pebble from which they were made, appear at the base of Figs. 11 and 12. I have some specimens which show a slight advance on the first blocking out, by the point on one side having received more work than other parts, and, in some completed implements, rough bold chipping, as if made by blows of a hammerstone, appear in the centre of the broad faces, though the edges have been dressed by secondary chipping. Plate VIII, Fig. 15, shows a large leaf-shaped spear-head of this kind, which has been made out of a boulder of flint. It is 7¾ inches long, 3 inches broad near the base, and about an inch thick. It is one of three which were found near Ballycastle, over eighty years ago. The other two were slightly smaller than the one figured, but were lost by lending them to cure cattle.

I have mentioned rounded pebbles or boulders with bruised ends being found abundantly in manufacturing sites. These are known as hammerstones, and are believed to have been used in striking the core of flint in order to detach flakes. They were also, no doubt, used in blocking-out implements. There are also, finger-like implements of flint, blunt, and sometimes smoothed at the ends, which have received the name of fabricators. These are supposed to have been the tools employed by the prehistoric people in pressing off flakes when finishing an implement; fabricators of bone or horn may also have been in use. Many used tines of deer, and pointed bones that would have been suitable as fabricators, have been found in such manufacturing sites as Whitepark Bay and Portstewart.

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[1] A small hoard of six was found in Knockandu, near the village of Clough, since this paper was written. They were found together between the peat and the clay when clearing out an old fence.

[2] 15*th Report Bureau of Ethnology*, Washington, p. 13 *et seq.*

[3] 2nd Edition, p. 35.

[4] p. 357.

CLASSIFICATION.

Arrow-heads have been variously classed by authors; and botanical, mathematical, and other terms have been used to describe them. Sir William Wilde[1] divides Irish arrow-heads into five classes, viz.:—triangular, indented, stemmed, barbed, and leaf shaped,[2] and Sir John Lubbock (Lord Avebury) adopts this classification in *Prehistoric Times.* Sir John Evans says "the better known forms of arrow-heads which occur in Britain, may be classed as the leaf-shaped, the lozenge-shaped, the tanged or stemmed, and the triangular."[3] In a paper by myself on the classification of Irish arrow-heads,[4] I considered that a better classification could be made, but that we had to take into consideration that old terms had obtained a certain hold on the public mind; and I tried to amend the classification by retaining the old class names then in use. The classes which I then recommended, and which I shall now take in the following order, as I am now dealing with their origin, are:—leaf-shaped, lozenge-shaped, kite-shaped, triangular, stemmed, and indented. In the catalogue of the National Museum of Antiquities, Scotland, published in 1892, flint arrow-heads are stated to be of "three varieties of form, leaf-shaped, lozenge-shaped, or triangular with barbs or basal stem for attachment to the shaft";[5] and in 1895, the Rev. Dr. Buick contributed a paper to the Royal Society of Antiquaries, Ireland, on Irish Flint Arrow-heads, in which he divided them into three classes:—the leaf-shaped, the triangular, and the stemmed. He says he adopts this arrangement "not only an account of its simplicity," but "because it seems more in line with the process of development out of which the typical forms have grown."[6]

If a fairly mixed series of arrow-heads were placed before any one who had no previous knowledge of the subject, and he were told to classify them, the simplest way he could do so would be to divide them into two classes, those having a continuous outline like the leaf-shaped, lozenge-shaped, kite-shaped and triangular, and those having indentures in the outline, like the barbed and indented; but I find that when we simplify in the classes, we have to introduce complications of the nature of divisions and subdivisions. The classification, which I recommended in 1877, taken in the order in which I now intend to deal with the various classes, will give us, in my opinion, some further insight into the origin of arrow-heads, as the various kinds are not all of the same age. The leaf-shaped and the lozenge-shaped are undoubtedly the oldest, and reach back into Palæolithic times, the continuance of old forms into Neolithic times suggesting a survival which I have already explained. The tanged form also reaches back to the Palæolithic age, and so, I believe, does the triangular, but barbs may have been developed at a later period. I believe the kite-shaped and the indented are our latest forms. The classes which I recommend are not equal in point of numbers. The leaf-shaped is more numerous than any of the others, the stemmed is also a large class, and the indented, though not equal to either of the other two already mentioned, is third. The lozenge-shaped, the kite-shaped, and the triangular are small classes, but it is not in accordance with a scientific method to ignore a species because it is small, or to incorporate it with an allied kind for the sake of convenience.

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[1] *Catalogue of the Royal Irish Academy*, 1863, p. 13.

[2] 4th Edition, p. 105.

[3] *Op. cit.*, p. 369.

[4] *Journ. Anthrop. Inst.*, vol. vi, p. 482.

[5] Enlarged Edition, p. 13.

[6] Vol. v, Ser. 5, p. 43.

Leaf Shaped Class.—A variety of the forms belonging to this class is figured in Pl. IX. Fig. 25 is the typical laurel leaf, Fig. 16 shows a somewhat similar example. Ovate forms are shown in Figs. 24 and 28; lanceolate in Figs. 22 and 27. Fig. 29 approaches the orbicular, and Fig. 30 is entirely of that form. The little point in the latter specimen is neatly broken off, but the flat surface of the break is still visible. Figs. 23 and 28 have rounded, and Figs. 19, 24 and 26 pointed bases. Fig. 18 has the point at the broad end, and represents a fairly numerous section of this class. A variety in sizes may be seen in Pl. VIII, Fig. 14, and Pl. IX, Fig. 20, though these are not the extremes on either side. Fig. 22 is a beautiful specimen; it is very thin, and greatly discoloured from repeated boiling in cow's drinks, in order to cure cattle which were elfshot.

Lozenge-shaped Class.—Flakes struck off in the manufacture of the larger implements, whether of Palæolithic or Neolithic age, were often of a lozenge-shape, and when dressed round the edges, as I have mentioned was generally the custom in the Stone age, a lozenge-shaped implement or spear-head was formed. I have specimens of this kind of implement of Palæolithic age from the rock shelters of the Dordogne. Some of the Somaliland implements, collected by Mr. H. W. Seton-Karr, are also of this shape, and the same form is still found among Neolithic flakes in Ireland; two views of a specimen of this kind are shown in Pl. VIII, Figs. 14, 14*a*. One of the four sides of the lozenge is formed by the plain piece of the core remaining on the flake where it was struck; this is best seen on the lower right-hand side of Fig. 14*a*. The outer face of the flake (Fig. 14) is merely trimmed round the edges; the inner face (Fig. 14*a*) is scarcely touched except at the point. Like the leaf-shaped, this class originated in Palæolithic times, and has survived among Neolithic implements. I can show many Irish lozenge-shaped points dressed round the edges only, and though I have not enumerated them among my lozenge-shaped spear- and arrow-heads, I have no doubt they were used as points for spears in their present state, and are not, at least in all cases, spear-heads partially made. Lozenge-shaped arrow- or spear-heads, neatly worked, of Solutrien age,[1] have also been found in France, and, therefore, I hold that this class has an independent origin, and was not derived from any other class. I should say it even competes for first place with the leaf-shaped, but this place we concede to the latter on account of its numerical superiority. Varieties of the lozenge form are shown in Pl. X, Figs. 31–37. Figs. 31 and 35 show two sides bounding the base shorter than those surrounding the point; Figs. 34, 36 and 37 show examples with four equal sides.

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[1] *Musée Préhistorique*, Plate XVII, Fig. 95.

Kite-shaped Class.—The kite-shaped is evidently a derived class, but I think it comes more naturally from the lozenge-shaped than from the leaf-shaped. The two classes are alike in each having four angles, and they might be classed together as the quadrangular with more show of reason than there is for including the indented with the triangular. This class is distinguished by having, in most specimens, the two sides which surround the base curving outwards, and the two sides which bound the point either straight, or inclining inwards, and the two principal faces often polished. The basal angle is sometimes absent, and, in such cases, the base is bounded by a semicircular arch. Examples of this class are shown in Pl. XI. Figs. 45 and 47 are two very fine specimens, each about 6 inches long; they have been polished on both faces before being finished by the flaking tool. Fig. 45 was found in peat between Bellaghy and Castledawson in co. Derry, and Fig. 47 at Tihorney, near the Bann, co. Antrim. Fig. 46 is very thin, and shows remains of the polishing on both faces; this specimen had also received a final chipping after being polished; there are, however, examples where the polishing has taken place, after the implement was apparently completed, by chipping. Fig. 44 shows a slight trace of grinding on one side; it was found at Clough, co. Antrim. Figs. 42 and 43 were also found at Clough, and show no trace of polish. I have never found any examples of this class in the sandhill sites which are found round the Irish coast. Spear-heads with polished sides have not, except in Portugal, as yet occurred out of Ireland,[1] but flint knives polished on one, or both, faces are found in Egypt.

Triangular Class.—Arrow-heads in the form of a triangle are a fairly numerous class, and are properly described by the term triangular; this class therefore has no necessity to take under its wing those which are described by the term indented, a much more numerous class.

The triangular was also, I believe, an early form of implement, while the indented must be a derived class, and later than the triangular. We often meet with points which are triangular, as well as those which are leaf-shaped and lozenge-shaped, and I have seen several triangular palæolithic implements.[2] I possess two specimens myself from Côtes-du-Nord, France, the smaller of which is 2 inches long, thin and finely worked. It could scarcely be useful for any other purpose than that of a spear-head; front and side views of it are shown in Plate VI, Figs. 1, 1*a*. The purely triangular forms are numerous in Ireland, and

[1] Evans, *op. cit.*, p. 372.

[2] See *Musée Préhistorique*, Plate X, Fig. 59. Also *Le Préhistorique*, 3rd Ed., Fig. 29. See also *Guide to Antiq. Stone Age, Brit. Mus.*, Figs. 6 and 27, for examples of triangular implements of Palæolithic age.

are generally well-made and highly finished. Examples are shown in Plate X, Figs. 38 and 40. Although Sir William Wilde employs the term triangular as a class name, he takes as his type two examples, both slightly indented at the base, rather like Plate XIII, Fig. 74. One of his figures shows notches near the base for holding the string. I believe this specimen cannot be Irish, as I have never met with an undoubted example notched in the same way. The purely triangular arrow-heads, like Figs. 38 and 40, do not seem to have been known to Sir William Wilde. There are specimens, some of which are slightly concave, and others, convex at the base like Plate X, Figs. 39 and 41, which might be included in this class.

Stemmed Class.—Stems were developed in Palæolithic times. The "*pointes à cran*," though they may have been knives rather than spear-points, had well developed stems, and a stemmed implement is figured in *Reliquæ Aquitanicæ*, A, Plate VI, Fig. 3. The following description is given of the figure:—"Spear-head shaped, but broken at the top, carefully chipped on both faces, and indented with a bold angular notch at each side of the broad end." I believe, however, that barbs were developed at a later date, when population had greatly multiplied, and war and the struggle for existence were causes of the invention of more deadly weapons. There are many varieties in this class; and in some of these varieties there is a great likeness among individual specimens. The larger implements, those from 3 to 4 inches long, were, no doubt, spear-heads. As a rule they differ from the smaller varieties by having the central tang large, well made, and projecting beyond the barbs. The stem was probably made both long and strong, with a view of enabling the spear-point to be securely attached to the shaft. There is a section of this class which has either no barbs, or very minute ones (Plate XII, Fig. 53). This kind is fairly numerous, and might have been classed by itself. It was, no doubt, the earliest of this class. Few of the specimens in this section are well made, or highly finished, and they gradually merge into the kind which have both a stem and well developed barbs. Some expand at the shoulders, and have strong barbs (Figs. 52 and 60); others are serrated on the edges (Figs. 51, 59 and 60); Fig. 61 shows a finely worked example of triangular shape which was found in Quolie Bog, near Ballymena: Fig. 49 shews an example of a numerous variety of the smaller barbed arrow-heads; Fig. 55 shows an example of the smaller kind with stem longer than the barbs, and expanding at the base, like some of the larger kinds; Fig. 48 shows barbs sloping outward; Figs. 50 and 57 show the barbs sloping inward, and longer than the central stem; Fig. 58 represents the barbed class of Sir William Wilde: Fig. 54, like Fig. 49, is representative of a considerable number of small arrow-heads, while Fig. 56 represents rather a rarer kind.

Indented Class.—The term indented having been one of the first names applied in the classification of arrow-heads, I think it is well to retain it. I have Sir John Evans with me here. In his Presidential Address, delivered to the Anthropological Institute in 1878,[1] in reviewing my paper on the classification of arrow-heads, he says:—"Without myself accepting all Mr. Knowles's conclusions as universally applicable, I think the term 'indented' is one which will be found of service, especially in describing a prevailing type of Irish arrow-heads." The term triangular which some antiquarians would apply to the class now under consideration is, I consider, most inappropriate, as many are not triangular in outline. This will be seen in viewing the different varieties of this class (Plate XIII). For example, Fig. 67 represents a fairly abundant variety; it is very unlike a triangle, and is more like a leaf-shaped arrow-head with a large indenture at the base. Fig. 71 is also a bad example of a triangle. Again, many examples of this class show five angles, Figs. 63, 64, 73, etc., two on each barb and one at the point, so the term triangular is in no way a good one when applied to this class.

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[1] *Journ. Anthrop. Inst.*, vol. vii, p. 519.

We would expect that the indented class would naturally arise from the triangular. We see that the base of some of the triangular class is slightly concave, and we can go step by step, from the slightly indented, as in Figs. 66 and 74, to those deeply indented, as in Fig. 65. The indented class may have had its origin in that way, but in one of the varieties of the stemmed class, it can be seen how very small the stems become as compared with the barbs, as in Plate XII, Figs. 50 and 57. These, however, are not the most extreme examples; compare rather Plate XIII, Fig. 62 with Fig. 63. In Fig. 62, the stem is very diminutive, and could be of no use in fixing the arrow-head to the shaft. It would, therefore, be an easy step from the small stem in Fig. 62 to no stem at all, as in Fig. 63. The stemless kind would be liable to split the shaft, but this could be remedied by applying a wrapping of gut, or sinew, round the shaft at its junction with the arrow-head. An example, mounted in the way described, was found in Kanestown bog, co. Antrim, in the summer of 1885, and I gave a note of the find with an illustration to the Royal Historical and Archæological Association, Ireland.[1] I reproduce the illustration in Plate XIII, Fig. 78.[2] There was a white substance at the base of the slit in the shaft into which the arrow-head fitted, which I believe was a cement, like putty. Putty, I have no doubt, would be known to the people of the Stone age. I have found, in the sandhill sites, many pieces of chalk, both scraped and rubbed; this, I believe, had been done to obtain the chalk in a fine state for paint, and possibly also to mix with grease to make cement.

The stemmed and indented classes are very much alike when mounted; unless the central stem is very large, it would be impossible, in a great many cases, to tell whether the mounted arrow-heads belonged to the stemmed, or indented class.

I have stated that the indented class was one of our latest kinds, but I believe it was invented prior to the northward migration of the people from Southern France and the borders of the Mediterranean, after the passing away of the glacial period, as the form is as well developed on the southern shores of the Mediterranean and in Northern Africa as it is in Ireland.

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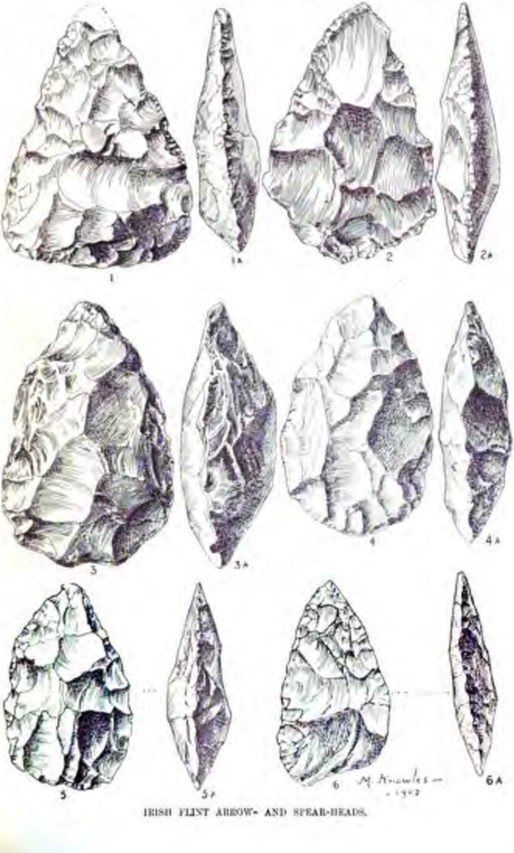
[1] Vol. vii, Ser. 4, pp. 126-7.

[2] An arrow-head, similar in shape to Fig. 75, Plate XIII, selected from my collection by the Ballymena Archæological Society in 1887, was mounted in Irish gold, after the style of the Kanestown specimen, so as to form a brooch or shawl fastener, and presented to the Queen on her Jubilee.

As it may be interesting to have an idea of the numbers in each of the several classes, I have counted those in my own collection; I find the numbers in each class are:—

Leaf-shaped	2,127
Lozenge-shaped	319
Kite-shaped	236
Triangular	220
Stemmed and barbed	1,589
Indented	872
Total	5,363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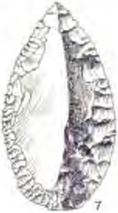
M. Knowles
1903

IRISH FLINT ARROW- AND SPEAR-HEADS.



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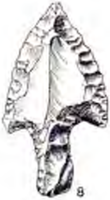

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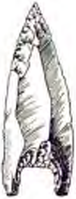

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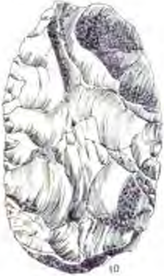

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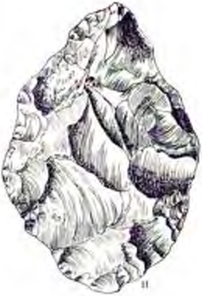

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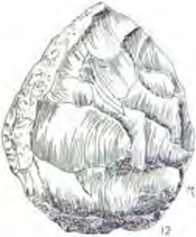

W. Knowles 1902

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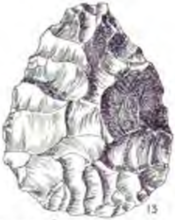

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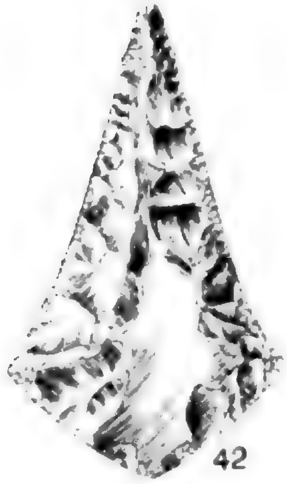
IRISH FLINT ARROW- AND SPEAR-HEADS.

Journal of the Anthropological Institute, Vol. XXXIII, Plate XI.



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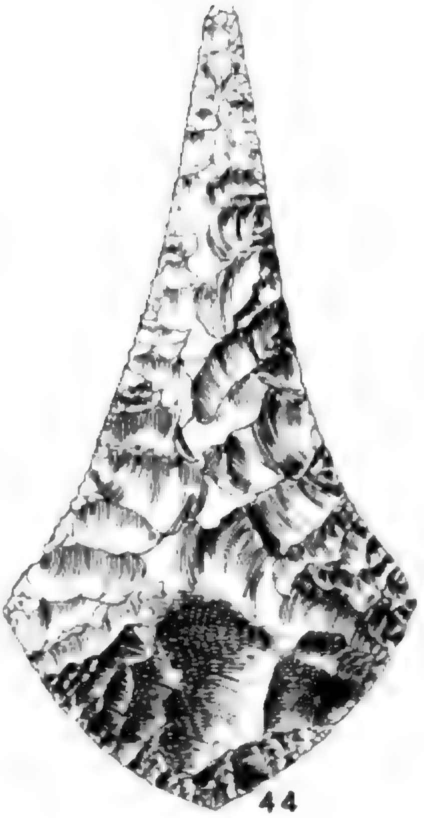

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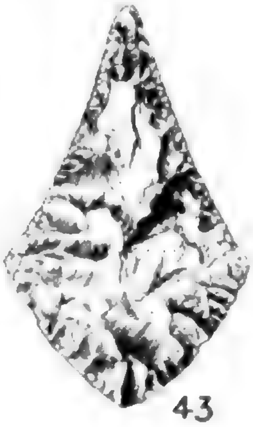

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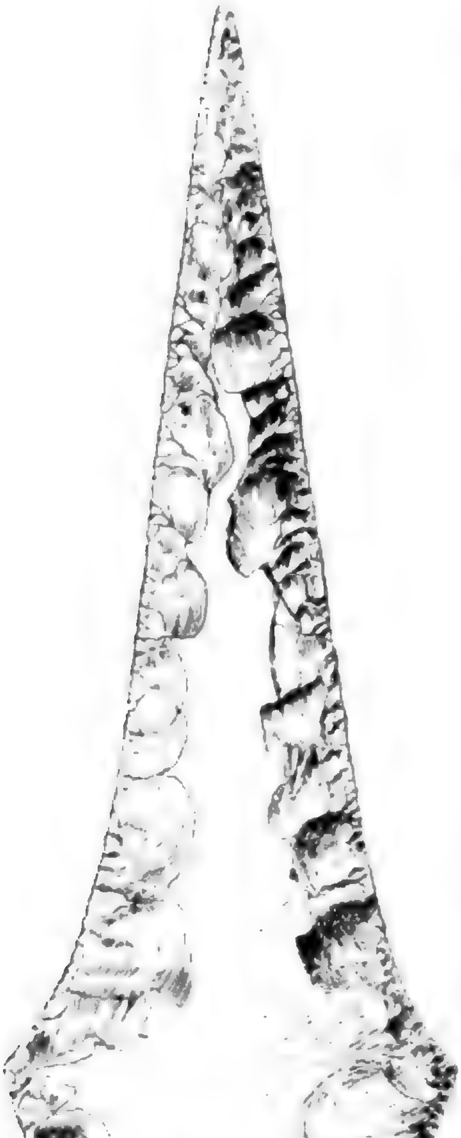

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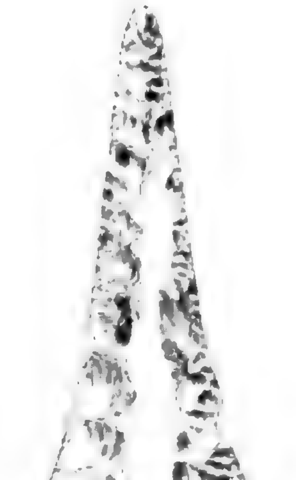

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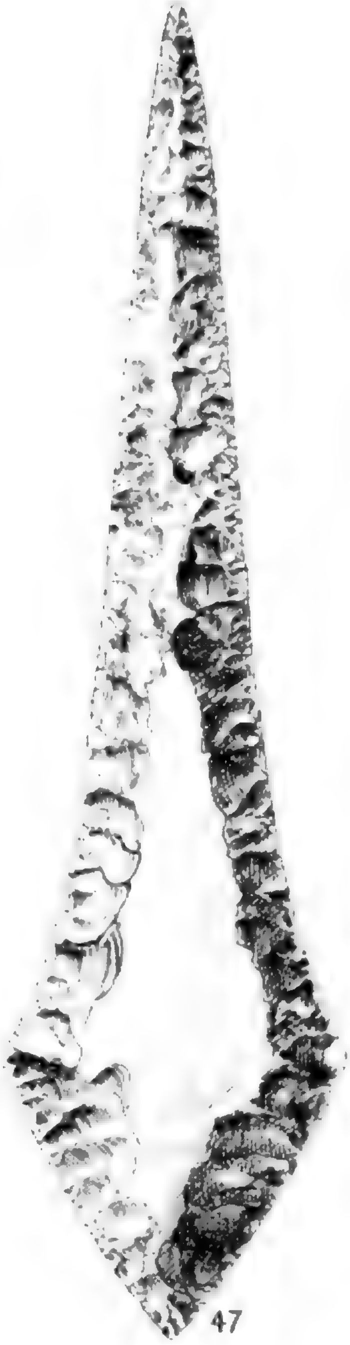

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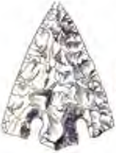
M. Knowles
1902

IRISH FLINT ARROW- AND SPEAR-HEADS.

Journal of the Anthropological Institute, Vol. XXXIII, Plate XII.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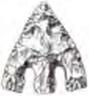
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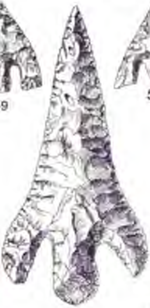
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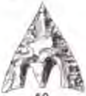
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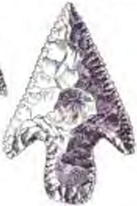
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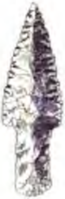
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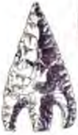
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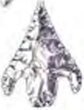
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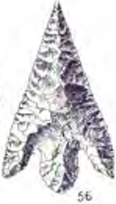
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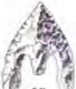
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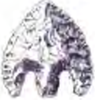
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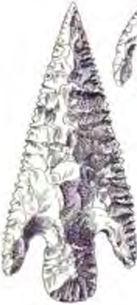
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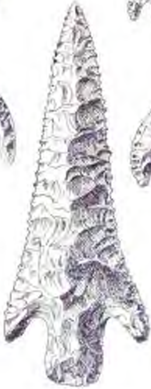
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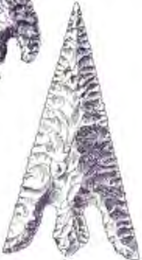
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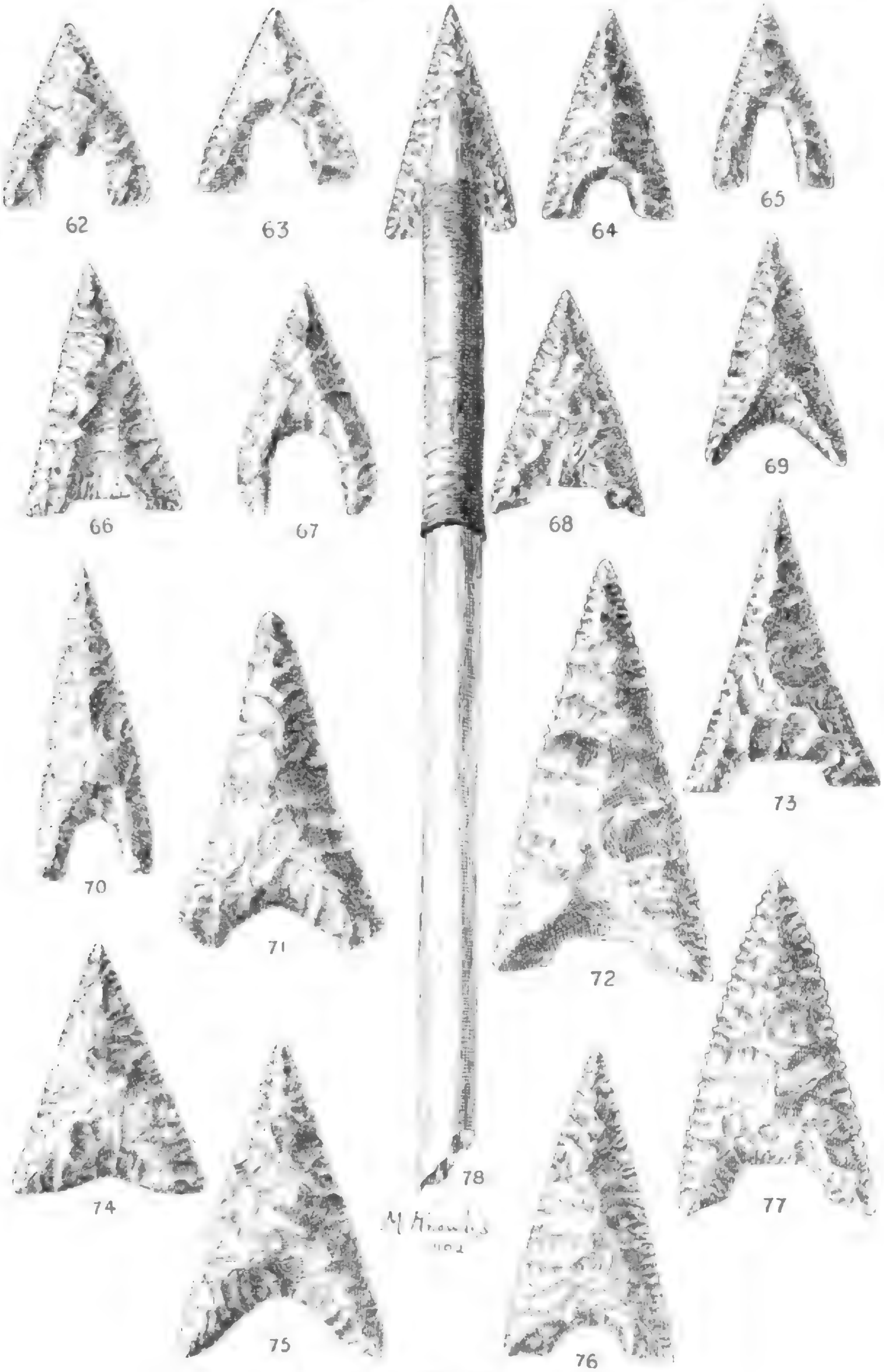
IRISH FLINT ARROW- AND SPEAR-HEADS.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M Knowles
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IRISH FLINT ARROW- AND SPEAR-HEADS.

THE KONDAYAMKOTTAI MARAVARS, A DRAVIDIAN TRIBE OF TINNEVELLY, SOUTHERN INDIA.

BY F. FAWCETT.

THE following note on the Maravars of Tinnevelly is but a bare statement of a few facts, which may possibly be of some use for purposes of classification or comparison. The physical measurements of the tribe included in this paper were made in 1900. At the same time I made some notes on their customs, which I intended to complete by further investigations. This, for various reasons, I have as yet been unable to do. But I have thought it well to submit the results of my inquiries, incomplete as they are at present. Should I find another opportunity of investigating this interesting tribe, a second report will be submitted to the Institute.

The account given of their origin is as follows:—The God Indra, having become enamoured of Ahalya, set out one night to visit her in the form of a crow, and, seating himself outside the dwelling of the saint, her husband, cawed loudly. The Rishi, believing that it was dawn, went off to bathe, while Indra, assuming the form of her husband, went in to the woman, and satisfied his desire. When her husband reached the river, there were no signs of dawn, and the Rishi was much perturbed, but not for long, as his supernatural knowledge (*Jnānadhrishti*) revealed to him how he had been beguiled, and he proceeded to curse the god Indra and his innocent wife. Indra was condemned to have a thousand organs of female generation all over his body, and the woman became a stone. The god Indra repented, and the Rishi modified his disfigurement by arranging that, to the onlooker, he would seem to be clothed or covered in eyes; and the woman was allowed to resume her feminine form when Rāma, in the course of his wanderings, should tread on her.

The result of Indra's escapade was a son who was stowed away in a "secret place" (*maravu idam*). Hence the name of his descendants—Maravar.[1] Being god-descended, they are *Devamar* or *Tevamar*, and every Marvan now bears the affix *Tevan* after his name.[2] Out of respect for their god-progenitor, the marriage token (*tâli*) of the women represents the head of Indra fastened to a bunch of human hair, or silken strings, representing his hair.[3]

Such is the origin of the Maravars, as given to me by one of themselves.

Other origins equally fanciful have been communicated to me second-hand, from people who are said to have been interested in the subject, but this one will serve as well as another, and it has the advantage of coming direct from the people themselves. But, in all the other tribal legends, Indra is regarded as the

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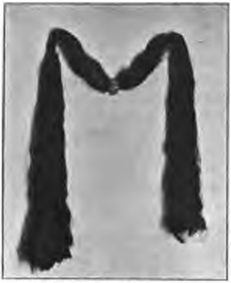
[1] This is, of course, merely a folk-etymology. *Marava* in Tamil means "a warrior."

[2] *Tevan*, in Tamil, is merely the South Indian form of the Sanskrit *deva*, "a god."

[3] One of these (Fig. 1) is in my possession. It is a thick tress of human hair nearly 3 feet in length, bound round with silk in two places near the middle, where there is a golden ring about the size of a filbert, hanging lengthways. Some said it represents "a human head," a fact worth noting, when we remember that the Andamanese, who are not very far away, wear human skulls suspended around the neck.



MARRIAGE TOKEN OF MARAVAR WOMEN.

progenitor of all the Maravars. Some say the word Maravan is derived from *Maravi*, "sin"; a Maravan being one who commits sin by killing living creatures without feeling pity, and without fear of God. The word is supposed to denote a person full of strength and anger—characteristics of the Maravars.

Their habitat is the southernmost part of the Presidency, the Tinnevelly district and south-east portion of the adjoining district of Madura. Husbandry and trade are their normal sources of livelihood, but a very large number of them are genuine marauders, living almost entirely by a systematic levy of blackmail —*Kudikkaval*, house protection, as it is euphemistically called--and crime. People who are familiar with the affairs of South India will remember the Tinnevelly riots of 1900, in which the Maravars took an active part. I do not, however, in this paper, propose to describe the Maravars generally, but only the Kondayamkottai tribe of that people. According to the census of 1891, out of a total of 308,000 Maravars, the Kondayamkottai tribe numbered 104,000.

The Kondayamkottai are probably the purest tribe of all, and the least influenced by modern civilization. They are strong, very dark, well-made men, physically above the average of Southern India. Fearless, energetic, and active, these Ishmaelites are dreaded by the general population, and though every man's hand is against them, they are still able to hold their own. Nor has the British Government been more successful in repressing them, for the unwritten laws of the Maravars are more powerful than the Code of Criminal Procedure and the Indian Penal Code.

I had an unusual opportunity of seeing these people as nature made them. It was in the Tinnevelly jail, when hundreds of them were awaiting trial after the famous riots. Being under-trial prisoners, the jail cut had not yet been applied to their hair; nor were they at liberty to fashion their locks in the usual manner, shaving the frontal part of the head from a line drawn over the vertex between the ears, which helps to make them look tame. There they sat in long rows, as wild a looking lot of men as I ever saw. It was as if an Australian Corrobboree were about to begin. More than half of my subjects were measured in jail. It may be observed that the difference between the average measurements of 10 and 25 individuals is very little

Referring again to the census of 1891, we find that, among all the Maravars, there are 1,036 females to every 1,000 males; that wives to husbands are as 1,077 to 1,000; that 86·6 per cent. of the males, and 99·7 per cent. of the females are illiterate; that one in every 969 is blind; that one in every 1,741 is a deaf mute; that one in every 3,951 is a leper; and one in every 6,289 is insane. Also, that of girls between the ages of 10 to 14 years, only 11 in every 10,000 are widows. Among the Brahmans the figure is 331. Child marriage is, therefore, less common among them than among the Brahmans, who look upon themselves as Aryans.

In my notes, I find it is recorded that in 13 families of the men who were measured by me, taking into account the brothers and sisters of adults, and not the young families of the men themselves, there were born 41 males and 23 females—surely a very unequal proportion. The average number of children, being added out of one mother in all cases, was nearly five. It is therefore evident that the race is prolific.

We will now turn to the physical measurements, which may speak for themselves in the accompanying table.

The colour number indicates that they are a very dark-skinned race: it corresponds pretty well with that of the wild tribes of the forests of Southern India. In the measurements of height sitting, as well as height kneeling, to stature = 100, they are widely separated from the Nambuthuri Brahmans, the truest Aryans of the plains of Southern India; and in head length to stature = 100, they are below all the jungle peoples of Southern India, so far as these have been recorded; orb-ridges and glabella scarcely, if at all, apparent; nasal notch generally deep. Hair on the body and legs is generally rather thick; on the head it is thick and coarse, and usually wavy; on the face, moderately thick.[1]

A fact perhaps worth noting is that their average weight, nearly 116 lbs., is much greater than the average for the well-fed prisoners in the gaols of the Madras Presidency, the figure for which is 109·5. It is higher even than the average weight of prisoners who are all of equal height with themselves. It is quite safe to say that they are considerably taller, broader across the shoulders, darker skinned, and heavier than the average for Southern India. I was unable to test their strength, and am therefore able to offer no more than a mere opinion that in this characteristic too they are above the average. In character they are bold and fearless.

Tattooing is said to be prohibited, but on the left hand of one man I saw a tattooed sun and crescent moon, and on his deltoid a symbol, like three feathers rising from an oval base, said to represent Râma. The lobes of the ears are pierced, and gold ear-rings are worn; the helix of the left ear is also bored at the top, and an ornament is generally worn in it. Gold and silver ornaments are worn on the arms and ankles. Women do not bore the right nostril. They bore the helix of *both* ears at the top. They cannot wear ear-rings set with stones: these must be of plain gold or silver. One man wore a spiral silver ring and an iron

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[1] See *Madras Government Museum Bulletin*, vol. iii, No. 1, where I have recorded the physical measurements, more or less completely, of thirty different peoples, including several classes of the Nâyars.

Kondayamkottai Maravar (Males). Tinnevelly, Madras Presidency.

Measurements.	Averages of 10.	Averages of 25.	Maximum.	Minimum.	Mean above.	Mean below.	To height = 100.	
Stature	168·0	167·9	174·7	161·4	170·8	164·2	—	Ages ranged between 22 and 47.
Height sitting	84·8	84·8	90·0	81·3	86·9	83·3	50·5	
Height kneeling	123·4	123·4	129·1	117·6	126·0	121·2	73·5	
Span	178·4	177·8	185·2	164·2	182·1	173·1	105·9	
Chest	81·3	81·5	88·1	70·0	83·8	78·2	48·5	
Shoulders	41·0	41·2	45·0	38·6	42·8	40·0	24·5	
Left cubit	46·9	46·9	50·2	43·4	48·4	45·4	27·9	
Left hand, length	18·4	18·6	20·1	17·0	19·5	17·9	11·1	
Left hand, width	8·1	8·2	9·4	7·2	8·6	7·8	—	
Left middle finger	11·1	11·1	12·1	10·4	11·5	10·7	—	
Hips	26·0	26·1	28·1	24·6	27·0	25·2	15·5	
Left foot, length	25·3	25·4	27·5	23·8	26·2	24·6	15·1	
Left foot, width	8·9	8·8	9·8	8·2	9·0	8·5	—	
Head, length	18·5	18·6	19·6	17·5	19·0	18·2	11·1	
Head, width	14·9	14·8	16·0	13·8	15·2	14·5		
Cephalic index	80·6	79·7[1]	87·7	74·2	83·0	77·2		
Bigoniac....	10·5	10·6	11·4	9·8	10·9	10·3		
Bizygomatic	13·5	13·2	14·0	12·4	13·5	13·0		
Maxillo-zygomatic index	78·0	80·2[2]	91·9	71·5	83·1	77·7		
Nasal height	4·7	4·7	5·1	4·2	4·8	4·5		
Nasal width	3·6	3·7	4·2	3·0	3·8	3·5		
Nasal index	77·4	78·1	93·2	62·5	82·9	71·9		
Vertex to tragus	13·1	13·1	14·2	12·2	13·6	12·7	7·8	
Vertex to chin	19·2	19·3	21·5	18·2	20·0	18·8	11·5	
Mid finger to patella	10·9	11·3	17·0	8·0	13·6	9·9	6·7	
Weight, naked	119·7 lbs.	115·8 lbs.	131 lbs.	94 lbs.	122 lbs.	105 lbs.		

[1] The index taken from the *averages* of head length and head width is 79·6.

[2] The index taken from the *averages* of bizygomatic and bigoniac is 80·3.

Average colour of skin : 43 (Broca).
Average colour of eyes : 2 (Broca).

ring, both together called *tade*, as a protection against scorpions. Iron or leaden rings are never worn simply as ornaments. Silver rings are worn on the toes. An anklet made of silver worn by one man was put on because he had a pain in his leg; he would give it up at the shrine of a village goddess when he was cured, and thus satisfy a vow.

Marriage.—In a monograph on the Nâyars (commonly spelled Nairs),[1] I wrote, in reference to the system of inheritance through females, of the Kondayamkottia Maravars as follows: "the girl on marriage joins the sept of her husband, but she retains her own sept name, and her children are of her sept, not of their father's. Marriage between persons of the same sept name is prohibited, and this is regulated solely through the mothers. The tribe is endogamous, but the septs within it are exogamous. Thus, a man or a girl cannot marry any one of the same sept having the same sept name (which is inherited through their mother), and *must* marry some one within the tribe, but of a different sept to his, or her, own—of his father's sept or any other. Though property devolves through the men, degrees between which marriage is prohibited are inherited through the women." All this is true enough so far as it goes, but it is a very scanty account of a very interesting matter, and I will therefore add to it, beginning with a description of what is meant by the words tribe and sept, as used by me.

The Kondayamkottia Maravars are divided into six sub-tribes, or as they call them *trees*. The word which is used for tree is, however, *kothu*, which means a *branch*. Each *tree*, or *kothu*, is divided into three *khilais* or *branches*. These I call septs. Those of the *khilais* belonging to the same tree, or *kothu*, are never allowed to intermarry. A man, or woman, must marry with one of a *khilai* belonging to another *tree* than his own, his, or her, own, being that of his, or her, mother, and not of the father. But marriage is not permissible between those of *any* two *trees*, or *kothus*: there are some restrictions. For instance, a branch of betel vine, or leaves, may marry with a branch of cocoanut, but not with *areca* nuts or dates. I am not positive what all the restrictions are, but restrictions of some kind, by which marriage between persons of all trees may not be made indiscriminately, certainly exist. The names of the trees or *kothus*, and of the *khilais* or branches, as given to me from the Maravar Padel, a book considered to be authoritative, are these:—

Trees.	*Kothus.*	*Khilais.*	Trees.	*Kothus.*	*Khilais.*
Milaku	pepper vine	*Viramudithanginan* *Sedhar* *Semanda*	*Komukham*	areca nut	*Kelnambhi* *Anbutran* *Goutaman*
Vettile	betel vine	*Agastyar* *Maruvidu* *Alakiya pandiyan*	*Ichang*	dates	*Sadachi* *Sangaran* *Pichi pillai*
Thennang	cocoanut	*Viniyan* *Vettuvan* *Nataivendar*	*Panang*	palmyra	*Akhili* *Lokhamurti* *Jambhuvar*

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[1] *Madras Government Museum Bulletin*, vol. iii, No. 3.

Unfortunately I am unable to trace out the meaning of all these *khilais*. *Agastya* and *Goutamar* (*Gautama*) are, of course, sages of old. *Viramudi thanginan* seems to mean "a king's crown bearer." *Alakhiya Pandiyan* seems to be one of the old Pandiyan kings of Madura. (*Alakhiya* means beautiful.) *Akhili* is perhaps intended to mean the wife of *Gouthamar* (*Gautama*) *Lokamurti*, the one being of the world, and *Jambuvar*, a monkey king with a bear's face who lived long, long ago.

The common rule regulating marriages among Brahmans, and indeed people of almost every caste in Southern India, is that the proper husband for the girl is her mother's brother or his son. But this is not so among the Kondayamkottai Maravars. A girl can never marry her mother's brother, because they are of the same *khilai*. On the other hand, the children of a brother and sister may marry, and should do so, if this can be arranged, as, though the brother and sister are of the same *khilai*, their children are not, because the children of the brother belong perforce to that of their mother, who is of a different *khilai*. It very often happens that a man marries into his father's *khilai*, indeed, there seems to be some idea that he should do so if possible. The children of brothers may not marry with each other, although they are of different *khilais*, for two brothers may not marry into the same *khilai*. There are no *house names* as is the rule in Southern India. Land is named after the owner, and not the owner after the land, as is the general rule.

There is no restriction in the matter of wives. A man may have as many as he likes, and as he can support, but there seems to be a growing feeling against plurality of wives. One man whom I measured, said he knew a man who had twelve wives at one time.

One of the first things to be done in connection with a marriage is that the female relations of the bridegroom must go and examine the intended bride to test her physical suitability. She should not, it was explained to me, have a flat foot, the calf of her leg should be slender, not so thick as the thigh; the skin on the throat should not form more than two wrinkles; the hair over the temple should grow crossways. The last is very important. It is preferable to arrange marriages during certain months (Vaigasi, Ani, Avani), and it is not allowed to enter into any marital negotiations during four months of the year (Margali, Panguni, Chittrai and Purattasi). The day is fixed by a Brahman, who is always consulted.

Marriage may be celebrated either before, or after, puberty, and, though girls may live with their husbands before this event, it is usual for the ceremony to take place after it. After puberty, a girl should not live with her parents. The male elders, as a rule, make the matches, but the female elders do so occasionally, and they are always assisted by the males. The "bride-price" is settled in the lady's house, and there is a ceremony (called *Nichiathambulam*), the cost of which is borne by the bridegroom, though it takes place in the bride's house. A new cloth is presented to the bride, and prepared betel (*pānsupāri*) to the guests; a feast closes the entertainment. There also takes place a ceremony (*Kulavi iduguthu*) in which women only take part. It consists chiefly of a shrill kind of keening. There is no distinct interval between the fixing of the marriage and the actual celebration.

The latter takes places at the bridegroom's house after the bride has been bathed and brought thither with music by his relatives. She is received by the bridegroom's *sister*, who gives her a charm to keep off the effect of the evil eye, and leads her into the house. The bride is fed with milk and fruit. The auspicious hour for the ceremony is previously ascertained, and as it approaches, the bride is dressed in red cloths (silk, if this can be afforded), and the ceremony takes place before the usual (*homam*) fire, doubtless in imitation of the Brahmans. It lasts for three days. The neck ornament (*tâli*) is handed by the bridegroom to his *sister* (or, if he has no sister, to his first cousin on the female side), who ties it round the bride's neck. It is an odd feature of the ceremony that the *tâli* must be obtained at the cost of the bridegroom's sister. When the *tâli* is tied, the *pal aragu* rite is performed. Milk, flowers, and sacred ashes are placed in two vessels, into which the father-in-law puts some money, and, following him, the father and the relations, in turn.

The second day of the ceremony is called the *Moi* day, on which visitors, as well as relatives, put down some money. It is not clear whether this is a contribution for the bride in addition to the bride-price, or for the bridegroom, or the festivities. Bride and bridegroom go in procession to a tank, bathe and clean their teeth, and during the night there is a procession of some kind. On the third day, that of the *kumbittu kattuthal* ceremony, the bride and bridegroom prostrate themselves before their elders and receive their blessings, also sacred ashes and money. Then there is the *sural vaikuthal* ceremony, when the bride's father, uncle, and other relations present the bridegroom with money, the amount of which must be *odd*. The bride's people, on their part, do the same to the bridegroom's *brother*. After all this, the mother and other female relations of the bridegroom pay to the bride what is known as the "*pillai mathu*." The bride and some girl friends produce an image covered in flowers, and, as soon as they do so, some money should be paid. Such are the main features of a marriage ceremony, the significance of which I will not attempt to explain. Invitation to a marriage is made by sending out betel leaves and twenty areca nuts. Among poor people, who reduce the three days' ceremony to one, the number of areca nuts is also reduced to ten. Marriage may be dissolved by either party, but whichever part initiates dissolution is obliged to make good to the other the cost he, or she, bore in the marriage ceremonies. A man told me he knew of a case in which the bride price was more than Rs. 150. This seems to be an enormously large amount, for the bride price paid by one of my men for his wife was 10 rupees 8 annas, or about 13 shillings.

Another form of the ceremony as described by one man was this. The Brahman priest (*purohit*) hands the *tâli* to the bridegroom's sister, who in turn hands it to the bridegroom, who ties a knot in it; the sister then ties two more knots in it, and then puts it round the bride's neck. After this has been done, and while the pair are still seated, the Brahman ties together the little finger of the right hands of the pair, which are interlocked, with a silken thread; the pair then rise, walk thrice round the marriage seat (*manavadai*), and enter the house, where they sit, and the bridegroom receives presents from the bride's father. The fingers are then untied. While undergoing the ceremony the bridegroom wears a thread, smeared with saffron, tied round the right wrist. It is called *kappu.*

Death Ceremonies.—News of a death is communicated to the community through a man of inferior caste, who bears a message written on a palm leaf and blows a conch shell, or in some cases, beats a drum. In the case of a man, a new cloth is given to the widow—but I am not sure by whom. In case of a woman, the *tâli* is removed at once, except when she is pregnant, when it is allowed to remain. The son of the deceased is the proper person to perform the ceremonies, and he assumes the *rôle* of funeral officiant (*karma karta*). It is he who first brings water in a certain kind of metal vessel wherewith to wash the corpse, around which there is much weeping. Parts of the ceremonies are these:—

Vaikai arini. Relatives bring rice to the house of the deceased, where it is received by the weeping women. There is generally an accompaniment by drums.

Mirmalai. Flowers are brought from a distance, and received by the Pandaram (a priest drawn from one of the inferior castes), who uses them for decorating the corpse.

Sandals having been fastened on the feet, the corpse is carried in a recumbent posture, legs first, to the place of cremation. A little rice is placed in the mouth, and the relatives put a little money into a small vessel which is kept beside the chest. The *karma karta* walks thrice round the corpse, carrying an earthen vessel filled with water, in which two or three holes are pierced. He allows some water to fall on the corpse, and breaks the pot near the head, which lies to the south. No Brahman attends this part of the ceremony. When he has broken the pot, the *karma karta* must not see the corpse again; he goes away at once, and is completely shaved. The barber takes the cash which has been collected, and lights the pyre. When he returns to the house, the *karma karta* prostrates himself before a lighted lamp; he partakes of no food, except a little grain, and boiled pulse and water, boiled with coarse palm sugar and ginger. Next day he goes to the place of cremation, picks up such pieces of calcined bones as he finds, and places them in a basket, so that he may, some day, throw them in water which is considered to be sacred.

On the eleventh or twelfth day, some grain is sown in two new earthen vessels which have been broken, and there is continued weeping around these. On the sixteenth day, the young plants which have sprouted are removed, and put into water, weeping going on all the while; and after this has been done, the relatives bathe and enjoy a festive meal, after which the *karma karta* is seated on a white cloth, and is presented with a new cloth and some money by his father-in-law and the other relatives who are present. On the seventeenth day takes place the *punyayavachanam* or purification, at which the Brahman priest presides, and the *karma karta* takes an oil bath.

Corpses of unmarried persons are buried, while those of all who are married are cremated. Where there is no son, the husband performs the obsequies of his wife. These can never be performed by women.

Miscellaneous customs.—All tribes of the Maravars will eat together, but they will not intermarry.

A widow may marry her deceased husband's elder brother, but not a younger brother. If she does not like him, she may marry someone else. Marriage may be dissolved by either party. The parties may take other partners in marriage.

Property devolves through the males. Daughters cannot inherit. Brothers are responsible for the expenses of their legitimate sisters' weddings, but they cannot give them any share in the family property.

The wood of the *pîpal* tree (*Ficus religiosa*) is never used for purposes of cremation.

The lobes of the ears of male children are generally bored between the third and fifth year. The helix of the left ear is always bored afterwards—in about the sixth year. Copper wire is used for the boring ceremony.

Children are generally shaved when about a year old, and this must be done before the ears are bored, but the shaving of girls is sometimes deferred until the fifth year.

When a girl's ear lobes have been bored, cotton is stuffed into the holes, afterwards a piece of rolled up cloth, and then leaden weights. The ear lobes become very elongated, being stretched out by heavy ear rings.

There are no special days on which shaving must, or must not, be done, but there is some preference for shaving on Mondays and Wednesdays.

Formerly the hair was grown all over the head, and worn long, and the armpits, chin, and cheeks alone were shaved, but nowadays every one shaves or cuts his hair just as it pleases him.

Names of family deities as named by individuals:—

Kâli.
Sudalair Madan.
Patchi Amman.
Subramanya of Tiruchendur.
Vannamalai Perumal of Nanguneri.

Many changes in the customs which regulate the life of the people have taken place of late in Southern India, and it is frequently a very difficult matter to reach the truth about the simplest customs, or even about those which have the deepest significance. For example, not long ago I was in a village largely inhabited by Kondayamottai Maravars, and asked about their custom of inheritance of the sept name through the mothers, instead of through fathers as is usual, when they laughed, and said they knew of no such custom. This answer surprised me, and it was not until much patience had been exercised, and the presence of the older men had been secured, that the prevalence of the custom was admitted. Then they could not say why they had denied it.

SKULLS FROM THE DANES' GRAVES, DRIFFIELD.

By William Wright, M.B., F.R.C.S.

[Presented March 10th, 1903. With Plates XIV–XV.]

Four miles due north of Driffield, in the open rolling country called the Yorkshire Wolds, is a small plantation known by tradition as "The Danes' Graves." It covers to-day some acres, but in earlier times it was more extensive, having been gradually encroached upon by the plough.

On its northern side, are traces of British earthworks, or entrenchments. Entering the plantation, the mounds or barrows are found to be numerous. The ordnance map gives 197 of them, early writers number them at 500. They are congregated closely together, 4 to 6 feet intervening. They are round in form, measure 9 to 33 feet in diameter, and are 1 to 3½ feet in height.

Almost all the barrows have been explored from time to time, chiefly by Canon Greenwell, F.R.S., and by Mr. J. R. Mortimer, and to their writings I am largely indebted for the archæological matter in this paper.

There is usually only one burial under each mound, but in one case, a child was found buried with an elderly man; in another, five skeletons were found, all seemingly interred at the same time; and in a third, two adult skeletons were found.

The graves are oval, measuring 7 feet by 6 feet, and 2 feet in depth. The skeletons are markedly flexed, the knees being situated close to the chin—so flexed are they found, that Canon Greenwell considers it likely that they were tightly swathed so as to be brought into that position.

In some of the graves were found remains of animals, coarse hand-made pottery, and ornaments such as hairpins, armlets, combs, and girdles. In one of the graves was also found the remains of a chariot, with horse trappings, but as no bones of horses were discovered, it is clear that the animals themselves were not interred.

Who the people here buried were, and where they came from, are questions much more easily asked than answered. Weapons and pottery, which are usually invaluable in helping us to an answer to such questions, fail us here, for the former are absent, and the latter seemingly unique. "The pottery," writes Canon Greenwell, "is neither in shape nor colour like that of which so many specimens are described in this memoir (referring to *Ancient British Pottery*), and it also differs from it in the absence of ornamentation, but it is still more unlike Scandinavian or Anglo-Saxon ware."[1] Mr. Mortimer, again, writes that "the pottery is very unlike any I have ever found with a true British interment in the large barrows on the wolds. It rather resembles a rude kind of dark Roman or Romano-British vessel than any other kind with which I am acquainted."[1]

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[1] *Ancient British Pottery.*

The mode of interment also is unusual, being only met with again in this country, I believe, at Arras and Beverley, both in the East Riding, and close to the Danes' Graves. According to Herbst, of Copenhagen, such interments are unknown in Denmark, Norway, or Sweden.

An additional interest is thus given to the skulls from these graves, for it is by an examination of them that we can alone hope to arrive at any definite conclusion.

The skulls I examined were twenty-two in number, and are now in the Mortimer Museum, Driffield. I considered fifteen of them to be those of males, and seven to be those of females. Three of the skulls belonged to young adults, judging from the size and the prominence of the frontal and parietal eminences, and the non-eruption of the wisdom teeth.

The condition of the skulls was sufficiently good to allow, in the majority of cases, the more important cranial measurements to be taken with accuracy. The facial portion of the skull was naturally in a less perfect state of preservation than the cranial portion. An asymmetry, probably posthumous, was discoverable in a number of the skulls, the skull appearing as though one lateral half of it had been pushed forward, causing the malar eminence of that side to present on an anterior plane to that of the other; there was a corresponding flattening of the occipital region.

The measurements were checked by at least one repetition; they were only taken where the condition and symmetry rendered them reliable. The single exception was that I endeavoured to obtain the cephalic index in all cases—the doubtful ones being marked by a "?"

The cranial capacity of the two skulls which allowed of an estimation, was in each case 1,325 c.cm. as measured by millet seed—the skulls being too fragile for the use of pellets. The skulls were, in both cases, those of females. The horizontal circumference of the skulls ranged from 473 to 537 millimetres, the transverse circumference from 391 to 435, and the sagittal from 488 to 528 millimetres.

Nine of the skulls were dolichocephalic, five were mesaticephalic; the condition of the remaining eight being too precarious to allow of an accurate classification. The cephalic index ranged from 68 to 79. Three of the skulls were orthognathous, and three were mesognathous, the range being from 91 to 101. The auriculognathic index, which was taken by Cunningham's modification of Busk's craniometer, ranged from 101 to 117. The total facial and upper facial indices (Kollmann) from 87 to 101, and from 51 to 66 respectively. The nasomalar index ranged from 106 to 112, the orbital, from 80 to 89, and the nasal, from 40 to 54. The palatal index ranged from 104 to 125, the molar, from 39 to 44. The palatal index of one skull was 140, but as this was so abnormally high, I have mentioned it separately. This skull was of further interest, since the second upper molar of either side had not erupted, whereas the other molars were all erupted, and considerably worn; the cause of the delayed eruption of the second molar being, presumably, the relative shortness of the hard palate and alveolar processes.

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[1] *Proceedings of the Yorkshire Geological and Polytechnic Society*, p. 297.

I have given no averages, being strongly of opinion that they are comparatively valueless and unscientific.

The skulls are thus seen to be those of a mixed people, which, however, on the whole, is dolichocephalic.

As regards the sutures—in six skulls, those of the calvarium were entirely, or in part, obliterated. The lambdoidal seemed to be the last to close, the sagittal being the first, and to begin at the obelion. This differs somewhat from what usually obtains—the lambdoidal closing before the coronal (Topinard).

Wormian bones were present in nine skulls; they were all in connection with the lambdoidal suture, and completing the occipital bone, except one which was to the left side of the posterior end of the sagittal suture, and which completed the parietal bone. One of the wormian bones measured 42 mm. by 41 mm., and formed the left upper part of the occipital bone. The lambda of three skulls was occupied by a large wormian bone.

The pterion of the ten skulls which were uninjured in this region, was invariably in H; the length of the spheno-parietal suture varied from 5 to 18 mm. Where the pteria of opposite sides could be compared, the left spheno-parietal suture was found to be slightly longer than that of the right side. In two skulls, epipteric bones were present, in each case they were bilateral, and in course of fusing with the parietal bone. In two skulls, the suture between the squamo-zygomatic portion of the mastoid and the periotic portion had not been obliterated, —a feature noticed by Dr. Haddon in prehistoric Irish crania. The abnormalities were chiefly of the nature of well-marked asperities for the attachment of muscles. Superciliary eminences were well-marked in five skulls, but never to the degree seen in the skulls of the Stone and Bronze ages. The upper rim of the orbit was thickened and swollen in one skull only, although a common condition in the skulls of earlier times. Supraorbital foramina were discovered in eleven of the skulls; they were bilateral in three of them. A sagittal ridge was noted on one skull, unusually large parietal foramina in another, and a small paramastoid process in a third. The teeth, speaking generally, were flattened. One lower canine was possessed of two fangs—an abnormality which the late Professor Rolleston used to consider was much more frequently met with in prehistoric crania than in those of later time.

Turning now to the classification of the skulls according to Sergi's natural system, I would say at the outset that it is the method to which I attach most importance as a means of distinguishing races from an examination of their skulls. The system is, I think, of especial value, as applied to prehistoric skulls, for many of them are fragmentary, often only a lateral half remains, the general shape being discoverable frequently, when measurements are impossible. Very few of the skulls described in this paper, for instance, would have repaid at all adequately an examination, had the latter consisted merely of the taking of measurements, so fragile and incomplete, in some respect, were most of them.

The examination of skulls by measurements has had a long and somewhat tedious trial, yielding disappointing results in so far as they enable us to distinguish and classify different races. It is further an uninteresting museum method—if I may say it without offence—dissociating the physical anthropology of the dead too markedly from that of the living. The graphic methods lately advocated by Flinders Petrie and Thomson, whilst certainly less cumbersome than the earlier table method, still, to my thinking, are based upon the fundamental error of attempting to find racial distinctions by other than zoological methods.

The advantages of Sergi's method are that there is not the same dissociation between the physical anthropology of the living and the dead; it makes the subject peculiarly interesting, and capable of daily application; it is based above all upon sound zoological principles, and, I think, gives us reason to hope that, when once the forms have been more clearly defined, and the nomenclature has become settled, we will be able to readily and accurately classify living European races. Further, it must have been the experience of all of us to meet someone possessed of an identically similar type of skull to that of an acquaintance—a likeness so close that one can have no doubt of their belonging to the same race. Analyzing such a resemblance, we would see that it consists perhaps in a peculiarity in the curve of the forehead, or the "cut" of the lower jaw, the general shape of the orbit, or the modelling of the cheek—features readily yielded to the trained and observant eye, but either not at all to the craniometer, or, at least, not sufficiently emphasized.

The objection to the method is an important one—that it is a difficult matter to distinguish between skulls resembling each other so much, and yet invariably differing in some detail or other. There is the further disadvantage of our not all seeing with the same eyes. A considerable part of the difficulty is, I feel, surmounted by photographing the skulls, for, by that means, we have then merely to deal with one plane, instead of several. There is the further advantage that a permanent record might thus be obtained which would be all important in helping us to determine the different types. But, having photographed the skulls, and placed the photographs side by side, the difficulty of classification is still great, since it may be taken that no two skulls are exactly alike. It is only by waiving the minor characteristics that we are able to have groups containing more than one skull. The question then presents itself—what are the important, and what the unimportant characteristics from a classificatory point of view? Many, for instance, might lay much stress upon the appearance of the superciliary eminences, many would study with particular attention the *norma verticalis*, whilst others would apply themselves to the *norma facialis* or *lateralis*. My opinion is that if we endeavoured, by repeated examination of a large number of skulls, to distinguish between the features which tend to be general, and those which are of merely occasional occurrence, and that if, in addition, we sought to explain the cause of the variations, we would ultimately arrive at some definite conclusions as to what are the important, and what the unimportant characters from a race classification point of view.

Further, I believe that it is only after working through a comparatively unmixed series, such as the prehistoric skulls, that we can with advantage pass on to the skulls of recent time, and so on to the living.

Paying special attention then, in the classification of these skulls from the Danes' Graves, to the so-called natural system, I distinguish five types. The first type is characterized by a vertical forehead, by a bulge of the occipital squamæ, by being orthognathous, by belonging to Sergi's *Ovoides* group, resembling somewhat the skull which he calls *Isobathys Siculus.* The second type is characterized by a sloping forehead, by the bulge of the occipital squamæ being either absent, or very faintly marked, by being less orthognathous than the first type, by belonging to the *Ellipsoides* type, resembling the skull termed *Ellipsoides Isocampylos.* The third type is characterized by a very sloping forehead, by prominent superciliary eminences, faint occipital bulge, well-marked inion, and a sagittal ridge. It closely resembles the skull described by Sergi under the name *Ellipsoides Ametopus.* Sergi found skulls of this type particularly amongst the Kurgans of Southern Russia.

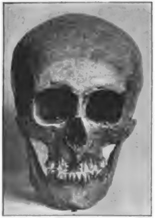
The fourth type is characterized by distinct superciliary eminences, a low forehead, and absence of the occipital bulge, resembling the skull described as *Ellipsoides depressus.*

The fifth type is chiefly characterized by a somewhat flattened vertex, as seen from the *norma lateralis,* and belongs to the type which Sergi calls *Parallelepipedoides.*

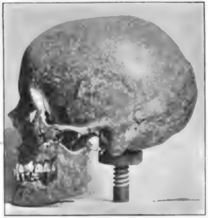
The first seven in the table of measurements, I consider, are of the first type, the 8th to the 17th, inclusive, of the second type, the 18th of the third type, the 19th to 21st, inclusive, of the fourth type, and the 22nd of the fifth type.

The shape of skull 1 (Pl. XIV), from the *norma verticalis,* is pentagonal; the explanation of this is found, I consider, in the pronounced bulge of the occipital squamæ as seen from the *norma lateralis.* The cause of the bulge is of interest. Many have drawn attention to the prominence of the frontal and parietal eminences in the child's head, but not, so far as I know, to that of the occipital eminence, which, however, is readily seen at the junction of the supraoccipital and interparietal portions of the occipital bone. The eminence is situated at the ossifying and hardest portion of the bone in each case, and is due, I would suggest, to the softer surrounding portions yielding to the pressure of the scalp. So pronounced is the occipital eminence, that the upper border of the occipital bone in the very young child is somewhat overlapped by the posterior borders of the parietal bones—a peculiarity made use of by the obstetrician in recognizing the posterior fontanelle. I associate the presence of a pronounced occipital bulge with an ill-filled condition of the subjacent portion of the canial cavity.

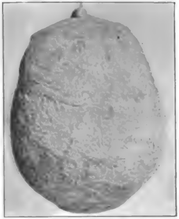
As regards the conclusions to be drawn from these skulls and the graves, we



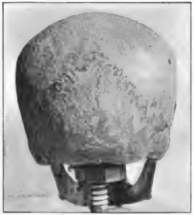
No. 1.—*Norma Facialis.*



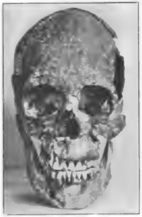
No. 1.—*Norma Lateralis.*



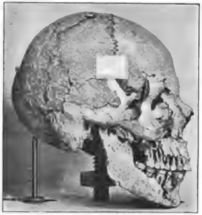
No. 1.—*Norma Verticalis.*



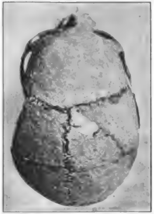
No. 1.—*Norma Occipitalis.*



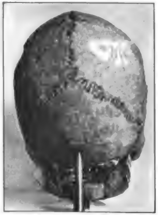
No. 8.—*Norma Facialis.*



No. 8.—*Norma Lateralis.*

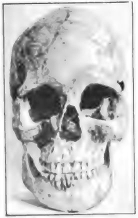


No. 8.—*Norma Verticalis.*

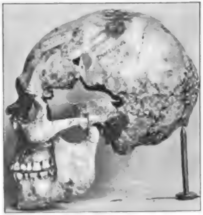


No. 8.—*Norma Occipitalis.*

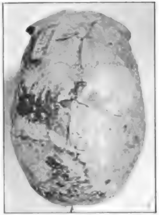
SKULLS FROM THE DANES' GRAVES, DRIFFIELD



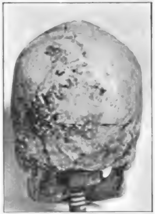
No. 18.—*Norma Facialis.*



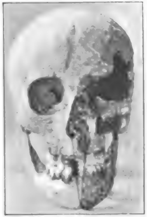
No. 18.—*Norma Lateralis.*



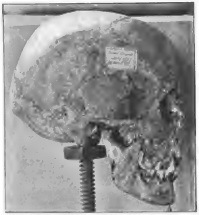
No. 18.—*Norma Verticalis.*



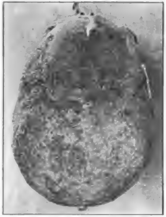
No. 18.—*Norma Occipitalis.*



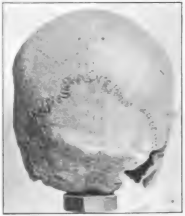
No. 21.—*Norma Facialis.*



No. 21.—*Norma Lateralis.*



No. 21.—*Norma Verticalis.*



No. 21.—*Norma Occipitalis.*

SKULLS FROM THE DANES' GRAVES, DRIFFIELD.

can affirm that the latter belong to the Iron age, and, from the primitive nature of the burials, to the early part of that age. The people buried belonged to a long-headed race, and were of short stature—the mean stature, as estimated from the femora, being 5 feet 3½ inches. The types of skulls resemble those found in Britain in Neolithic time. Dr. Haddon has described skulls of that time from Ireland as resembling Sergi's *Isobathys Siculus* and *Ellipsoides Depressus.* Two hypotheses as to these people seem to me possible: either they were the direct descendants of the British Neolithic race, who lived comparatively unmixed through the lengthy Bronze age, or they were settlers from the continent belonging to a race which was more or less identical with that of the British neolithic dolichocephals. The latter hypothesis is to me the more likely one.

In favour of the continental origin, we have the nearness to the East coast—the graves are about 8 miles from Scarboro'—similar graves close by at Arras and Beverley, and so far as I know no where else in Britain. The settlement was no doubt a peaceful one, judging from the presence of women and children, and the absence of weapons. The presence of goats, again, so frequently in the graves is suggestive of their constituting the burial ground of a pastoral community. Further, we are told that there were two contrasted kinds of expeditions about this time, from the continent to Britain, one, north of the Wash, for the purpose of colonization, and one, further south, for booty.

Supposing then that they came from the Continent, we have little to guide us in endeavouring to determine from which part. I think we may presume, from geographical reasons, that they in all probability came from northern Europe; and Scandinavia, having at that time a comparatively pure dolichocephalic population, may have supplied them. The "Viking" type of skull, figured by Sergi, closely resembles the skulls constituting my first type.

The paucity of our knowledge concerning the origin of these people is a striking commentary on the difficulty, not to say impossibility, of applying the results obtained from measurements to a practical use in the identification of race.

Skulls from the Danes' Graves, Driffield.

Cranial Measurements.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	♀	♂	♂	♀	♂	♂	♀	♀	♂	♀	♂	♀	♀	♂	♂	♂	♂	♂	♂	♂	♂	♂
Glabello-occipital length....	179	176	185	180	182	177	177	180	182	185	188	183	162	192	176	188	191	190	188	180	183	183
Ophryo-occipital length ...	179	176	185	181	181	174	176	178	180	181	188	—	160	188	177	186	187	184	187	179	183	180
Maximum breadth ...	141	133	134	139	141 ?	131	130	130	143 ?	137	141	134 ?	130 ?	137	135	132	130 ?	129	132 ?	138	131	131 ?
Basio-bregmatic height ...	121	—	128	—	—	—	129	—	141	—	—	—	—	141	137	—	—	—	—	134	131	
Stephanic breadth ...	116	—	110	114	127	—	118	—	116	—	—	—	—	—	—	115	108	92	—	110		
Asterionic breadth	116	—	116	108	—	107	105	110	118	—	108	—	106	115	111	107	—	—	—	119	107	
Minimum frontal breadth	89	89	97	101	104	88	95	87	92	100	98	—	89	100	95	95	95	86	97	93	—	92
Frontal longitudinal arc	122	120	127	130	128	113	121	123	130	125	125	—	112	128	129	129	128	120	127	124	125	131
Parietal longitudinal arc ...	98	127	126	117	134	122	124	131	122	132	133	—	110	134	131	141	130	130	134	138	133	134
Occipital longitudinal arc	141	112	114	116	112	113	119	—	118	120	112	—	—	123	115	103	110	—	115	112	110	105
Fronto-occipital arc	361	359	367	363	374	348	364	—	370	377	370	—	—	385	375	373	368	—	376	374	368	370
Foramen magnum length	36	39	41	41	38	38	38	—	37	38	—	—	—	38	41	—	40	—	—	41	38	
Basio-nasal length ...	94	—	—				96	—	108	—	—	—	—	105	99	—	—	—	—	88	98	
Auriculo-nasal radius ...	89	89	93	91	89	88	90	95	94	91	104	—	86	94	90	—	—	100	—	84	90	
Auriculo-bregmatic radius	110	117	117	116	118	109	115	121	118	123	125	—	110	123	122	130	122	121	—	112	114	
Auriculo-bregmatic arc ...	292	—	301	296	303	272	288	296	302	306	—	—	281	304	308	320	298	—	—	285		
Biauricular breadth ...	119	108	115	128	131	120	116	110	123	122	121	—	110	124	109	115	—	107	—	120	114	
Transverse circumference	411	—	416	424	434	392	404	406	425	428	—	—	391	428	417	435	—	—	—	405		
Horizontal circumference	508	504	521	521	537	495	500	490	515	520	—	—	473	532	501	518	520	507	—	508		
Sagittal circumference	488	—	—	—	—	—	498	—	515	—	—	—	—	528	515	—	—	—	—	503	504	
Cranial capacity	1,325	—	—	—	—	—	1,325															
Facial Measurements.																						
Basio-alveolar length	86	—	—	—	—	—	89	—	109	—	—	—	—	104	98	—	—	—	—	—	92	
Auriculo-alveolar radius ...	90	93	97	94	95	99	93	102	111	93	—	—	93	104	100	—	—	106	—	—	95	
Auriculo-mental radius	112	109	110	115	126	119	113	120	131	121	118	—	113	128	122	—	121	118	—	112	113	
Nasio-alveolar length	63	—	60	—	72	62	66	70	73	66	—	—	59	68	64	—	—	71	60	70	66	
Nasio mental length	108	99	107	—	121	113	112	118	125	117	—	—	104	115	118	—	119	116	—	118	116	
Bizygomatic breadth	123	113	—	—	139	—	120	—	124	—	—	—	110	133	—	—	—	119	—	—		
Max. bimaxillary breadth	84	—	92	100	95	—	89	—	91	—	—	—	79	91	—	—	—	90	—	86		
Bidacryal breadth	—	—	—	24	—	—	21	20	19	21	—	—	16	20	—	—	19	16	—	24		
Bimalar breadth	87	—	94	—	—	—	92	91	93	96	—	—	88	101	—	—	—	97	—	92		
Nasomalar line	94	—	101	—	—	—	99	101	103	106	—	—	94	108	—	—	—	108	—	98		
Nasal height	50	43	47	48	57	52	48	50	52	51	—	—	45	52	47	—	—	51	46	49	50	
Nasal width	20	—	24	24	24	24	26	24	—	23	—	—	21	25	—	—	—	22	24	23	23	
Orbital width	40	38	—	44	41	—	38	39	39	40	—	—	38	41	—	—	46	44	—	40	43	
Orbital height	35	—	—	37	35	—	34	33	32	35	—	—	29	33	—	—	39	35	—	33	37	
Palatomaxillary length ...	44	48	52	—	56	54	48	56	57	50	—	—	55	58	55	—	46	58	—	52	53	
Palatomaxillary breadth .	55	57	58	—	60	57	56	61	67	60	—	—	60	60	59	—	64	63	—	55	56	
Molar length	38	—	40	—	—	42	—	—	42	—	39	—	—	41	42	—	—	42	—	37		

SKULLS FROM THE DANES' GRAVES, DRIFFIELD.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Measurements of Mandible.	♀	♂	♂	♀	♂	♂	♀	♀	♂	♀	♂	♀	♀	♂	♂	♂	♂	♂	♂	♂	♂	♂
Symphysial height	29	26	30	30	26	32	29	28	37	31	33	23	27	33	38	26	32	32	—	31	33	
Coronoid height....	55	51	61	69	75	55	60	—	62	63	61	63	—	66	69	63	—	68	—	—	62	
Condyloid height	54	43	52	61	63	60	59	61	60	50	51	54	47	58	64	49	63	57	—	55	56	
Gonio-symphysial length	85	77	79	85	93	83	77	79	91	85	88	81	85	93	82	82	87	93	—	83	82	
Bicondyloid width	106	96	114	121	123	117	107	101	119	118	—	—	—	117	104	—	—	117	—	120	106	
Bigonial width	84	81	92	101	99	99	74	88	96	99	94	—	80	90	89	83	104	96	—	100	90	
Width of ramus....	33	32	34	28	31	28	28	28	30	32	34	27	28	36	32	31	30	39	—	28	28	
Indices.																						
Cephalic breadth index	79	76	72	77	81 ?	76	74	72	78 ?	74	75	73 ?	70 ?	71	76	70	67 ?	68	70 ?	77 ?	72	72 ?
Cephalic height index	68	—	70	—	—	—	73	—	77	—	—	—	—	73	78	—	—	—	—	74	72	
Facial index (Kollmann)	88	88	—	—	87	—	93	—	101	—	—	—	95	87	—	—	—	97				
Upper facial index (Kollmann)	51	—	—	—	52	—	55	—	66	—	—	—	54	51	—	—	—	65				
Stephano-zygomatic ind x	94	—	—	—	91	—	98	—	93	—	—	—	—	—	—	—	—	80				
Gnathic index	91	—	—	—	—	—	94	—	101	—	—	—	—	99	99	—	—	—	—	—	94	
Auriculo-gnathic index	101	104	104	103	107	112	103	107	117	102	—	—	108	110	111	—	—	106	—	—	105	
Naso-malar index	108	—	107	—	—	—	107	111	112	110	—	—	107	107	—	—	—	111	—	106		
Nasal index	40	—	52	49	42	46	54	48	—	45	—	—	52	48	—	—	—	43	52	46	46	
Orbital index	87	—	—	84	85	—	89	84	82	88	—	—	80	80	—	—	85	80	—	82	86	
Palatal index (Flower)....	125	118	111	—	107	106	116	109	117	120	—	—	109	104	107	—	140	109	—	106	106	
Molar index (Flower)	42	—	—	—	—	—	—	—	39	—	—	—	—	41	42	—	—	42	—	44		

ON TWO MEDICINE-BASKETS FROM SARAWAK.

BY R. SHELFORD, M.A., Curator of the Sarawak Museum.

[PRESENTED FEBRUARY 10TH, 1903. WITH PLATE XVI.]

THE objects figured on Plate XVI are two medicine-baskets (*lupong*), with some of their contents, of late the property of two Sea-Dyak witch-doctors (*manang*). The basket shown on the right was bought by a Sea-Dyak, Garaman by name, a former collector for the Sarawak Museum, from a *manang* in the Saribas district, who, having retired from his profession on account of old age, was not unwilling to part with his stock-in-trade and secrets for a consideration. Garaman, on his own initiative, carefully labelled each simple and charm with its name and supposed action, and then sold the outfit to me. The other basket is from the Undup River, and was presented recently to the Sarawak Museum by the Rev. W. Howell, a gentleman whose zeal and generosity in collecting and presenting to our Museum numerous objects of ethnographical interest, I take this opportunity of acknowledging with cordial thanks.

An account of Sea-Dyak *manang* and the ceremonies known as *pelian*, which they practise, has been given by the Ven. Archdeacon J. Perham in the *Journ. Asiat. Soc.* (Straits branch), No. 19 (1887); and is quoted in Ling Roth's work on the *Natives of Sarawak and British North Borneo*, vol. i, pp. 271–283. Messrs. Bailey and Howell have added to this account in their valuable *Sea-Dyak Dictionary*,[1] under the words *manang* and *pelian*; and, in the appendix to the dictionary, have included, amongst other songs and prayers, a portion of a *manang's* incantation (Appendix, p. 7, No. vi). They also give a list of Sea-Dyak terms for the various ailments known to them (*l.c.*, p. 22, No. xxvii).

With such well-recognized authorities already in the field, I content myself in this paper with giving merely a catalogue of the contents of these two medicine-baskets, noting at the same time the supposed properties of each charm and simple. Even in this humble task I owe much of my information to the generous aid of Mr. Bailey.

The articles in a *lupong* may be divided into two classes:—

I. *Charms*, which are, of course, supposed to possess magical properties. These again might be subdivided into—

1. Charms that frustrate the attacks of evil spirits, and are, therefore, purely *supernatural* in their effects. A good example of these is *ubat pansa utai*.

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[1] This Dictionary is now completed; it can be obtained at the Printing Office, Sarawak.

2. Charms that act directly on such diseases as are not attributed to evil spirits, *e.g.*, *ubat enda batok*. Were it not rather a contradiction in terms, these might be styled *natural* charms. It is not always easy to distinguish the latter from—

II. *Simples*, which have actual curative properties.

The *dukun*, a term borrowed from the Malays, is, amongst the Sea-Dyaks, a man who cures ordinary ailments by means of simples, but who does not employ charms, nor perform the *pelian* ceremony. He is naturally considered to be an inferior class of being to the *manang*, but on the other hand his fee is much smaller.

It is well to note that no two *manang* employ exactly the same remedies in their doctoring ceremonies, though they may have a few in common. Some of the simples and charms are revealed to the *manang* in dreams, the use of others may be determined by pure fancy, and very potent charms may be handed down from one generation to another. Such causes are sufficient to account for the difference between the contents of the two *lupong* described below.

PL. XVI, FIG. 2. THE *Lupong* FROM SARIBAS RIVER.

The Saribas *lupong* (Fig. 2) is cylindrical, 40 centimetres in height and 17 centimetres in diameter. It is made of *entli* wood, *Shorea rugosa*. *Heim* (*Dipterocarpeæ*), and covered on the outside with rattan plaited into characteristic Sea-Dyak designs; two loops of rattan, on which are threaded small rings of brass and rattan, coloured black and red, encircle the basket, one at the rim, the other a little below; a looped string of beads with small brass bells attached to alternate loops runs round the basket below the lower rattan loop. The mouth of the basket is closed by a long flap of the inner bark of the *garu* wood,[1] *Aquilaria malaccensis* (*Thymeleaceæ*), the "eagle-wood" of commerce. This cover, together with the good workmanship shown in the manufacture of the basket, denotes that the owner was an experienced and wise *manang*. Shoulder-slings of common white cloth are attached, at one end to the bottom, at the other, to the sides of the basket.

Slung to the outside of the *lupong* are the following:—

1. A tuft of dried leaves of bamboo, *ubat enda perba* (lit. "medicine not ague"), a remedy for ague.
2. A small china pot covered with skin, and containing oil obtained from *Kapayang* seeds, *Pangium edule* (*Bixineæ*); this when smeared on the *manang* renders him invisible to the spirits.
3. Two porcupine quills, for dispensing the oil.
4. Two canine teeth of a bear, and a little cylinder of horn, *pransang manang pelian*, charms to make the *manang* bold in attacking evil

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[1] Cf. Skeat, *Malay Magic*, pp. 206–212, for an account of Malay superstitions concerning this wood.

spirits; *pransang* is also applied to a medicine given to hunting dogs to make them keen and fearless.

5. A small piece of wood, wrapped up in cloth (*engkrabun*), a charm which causes blindness (*rabun*, dimness of sight) to any unauthorized person who looks into the *lupong*, and apparently amongst the Saribas Dyaks, effective also in shielding the *manang* and his patient from the observation of evil spirits.

The contents of the *lupong* (Pl. XVI, Fig. 1) are as follows:—

I. CHARMS.

1. *Batu ilau* or *Batu enggau meda samengat.*

i. These are quartz crystals, and are used by the *manang* as glasses in which to view the condition of the patient's soul (*samengat*); whereby he is enabled to judge of the severity or nature of the illness, which he can then treat by the *pelian* ceremony best adapted to the purpose. Mr. Bailey informs me that the patient's soul may be seen in the "sight stone," either mingled with the souls of people who are well, or else separated from them; in the latter case the condition of the patient is considered serious.

ii. To detect the whereabouts of the soul, which, perhaps, has been expelled from the body by evil spirits. The *manang* having discovered the position of the soul in his crystal, goes into a trance, as described by Perham, and wakes from the trance with the soul of the sick man in his hand; this soul may be a small bit of wood, or stone, or, perhaps, a small beetle. My Dyak friend, Garaman, informed me that his father once underwent treatment at the hands of a *manang*, and his soul when retrieved by the *manang* proved to be a minute black beetle. The movements of the insect on the open palm of the *manang's* hand were watched with interest; since, should the beetle walk towards the wrist, the patient would recover; if towards the fingers, he would die; in this case, fortunately, the omen was favourable, and the beetle was then put back whence it was supposed to have come, viz., from the patient's head.

The Malay belief in the sevenfold nature of the *samengat* (Skeat, *Malay Magic*, p. 50), induced me to make some inquiries as to whether a similar belief is held by the Sea-Dyaks or not; the Right Rev. the Bishop of Singapore and Sarawak very kindly made similar inquiries of the Sea-Dyaks of his extensive diocese on my behalf. The general result obtained is to show that these people do *not* hold a belief in the manifold or plural nature of the *samengat*. The answers to our queries were diverse, and I venture to transcribe a few of the more interesting.

(*a*) Laga (a Balau Dyak) and Dasu (a Saribas Dyak), both retired *manang*, said that a man had one *samengat*, and each of his possessions, such as his sword, his coat, his boat, also had a *samengat* which departed from them if broken, or when old and worn out; in such a sense only could a man be said to have a manifold soul.

(*b*) Bunyan, a retired *manang* of the Undup River, stated that the idea of a plural soul might have originated in the minds of some, through the chicanery of a *manang*. The soul of the *manang* can descend into Sabayan (the Sea-Dyak Hades) in quest of the soul of a sick man, and for this he obtains a fee; in order to increase his fee, a *manang* might assert that his search for the errant soul was unsuccessful, but that he would be willing to search again in consideration of another fee, and so on, till his greed of gain was satisfied, or the patience of his victim exhausted.

(*c*) Apai Bada, an old Undup Dyak, seemed to think that to say of a man that he had seven *samengat*, was as much as to say that he was seven-lived (in the sense that we talk of a cat with nine lives); he himself had survived many dangers, and had perhaps lost some of his souls; eventually he would doubtless lose the last, and then he would really be dead. All this was, however, thrown forward as a suggestion to account for a hypothetical belief, and not held as an article of faith.

(*d*) One of the Sibuyaus, a tribe closely allied to, if not identical with, the Sea-Dyaks, told the present Rajah of Sarawak[1] that there are seven *samengat* or lives, the life in this world being one, after which there are six more existences, in the first of which punishment for sin committed on earth must be undergone.

The very remarkable statements subsequently made by His Highness's informant concerning the nature of the punishments inflicted, and the bliss of the seventh heaven finally attained, lead one strongly to suspect that the man was romancing, as natives are only too prone to do when questioned about their superstitions and ideas of the immaterial world. Certainly none of the statements of belief of this Sibuyau, can be paralleled amongst the other tribes of Borneo; most probably they originated from vague ideas of Christian and Mohammedan religious beliefs, acquired during an intercourse with missionaries and Malays.

(*e*) The following quoted from *Bailey and Howell's Dictionary*, part iv, p. 146, will accentuate the fact that the ideas of the Sea-Dyak concerning the immaterial world are neither very definite, nor universally held:—"Dyaks have very vague notions respecting the soul and its attributes. The *Manang* are generally agreed that it is similar to a man's shadow (*baka kelemayang mensia*). Some state that everybody possesses *seven* souls. When a man dies, it is asserted by some medicine men, his soul goes to Hades (*Sabayan*) and there abides until the feast to the dead (*berantu*) is given on earth. This it attends. It then travels to *Mandai Mati* (a mountain in the Netherlands-India Borneo), where it stays an indefinite period, finally becoming dissolved into dew. The dew is then taken up into the paddy ears, and they become rice, which is eaten by people who, in their turn, die, and the process is continued."

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[1] Quoted by Ling Roth, *loc. cit.*, vol. i, p. 218.

The triple soul of the Toradja of Celebes, alluded to by Mr. Hartland in his review of Dr. Haddon's *Head-Hunters, Black, White and Brown*,[1] can certainly be paralleled amongst the Sea-Dyaks by the *nyawa* or breath, the *enselua* or *personal soul*,[2] and the *samengat* or vital essence, but these are all separate, and, as I think I have shown above, there is no reliable evidence to show that the Sea-Dyaks retain a definite or universal belief in a manifold *samengat*.

2. *Pengelela*; chips and knots of wood kept in a scooped out betel-nut. A charm which enables the *manang* to visit all parts of the world, and the spirit-world (*sabayan*), in his search for the soul of his patient; the journey, no matter how great the distance, occupies but little time.

3. *Ubat kena betampal* (Pl. XVI, 1*a*). A portion of the nest of the "frog-mouth," *Batrachostomus auritus* (Sharpe), two boars' tushes, and a water-worn pebble; a charm to patch up (*tampal*) that part of the body which has been torn by evil spirits. The treatment is as follows:—the *manang* makes an imaginary cut on the finger, wrist, or affected part of the body of the patient, places on the imaginary wound a pinch of the down with which the *Batrachostomus* makes her nest, and to this applies the point of one of the boar's tushes; the tush is gently hammered with the stone, and the pinch of down is supposed to be driven to the torn part of the body, and to patch it up.

4. *Pemenat* (from *penat*, "tired," "stiff," "numb"). Two pieces of wood which, when rubbed on the skin, deaden the pain of a cut such as that described above.

5. *Penyampu.* A small piece of wood; a general remedy, supposed to overcome any evil spirit that causes the illness of the patient; the skin of the patient is cut in the manner just described, and the *penyampu* ignited and waved about; the evil spirit escaping from the imaginary wound is overcome by the fumes.

6. *Ubat pansa utai* (Pl. XVI, 1*b*). Knots of wood in a small basket. A man who is *pansa utai* is afflicted by evil spirits, more particularly by *Antu Gergasi*, a demon who, with his dogs (*pasun*), hunts the souls of men, wounding them with darts from his blowpipe (*sumpitan*).

7. *Pemuta antu.* A piece of *dammar* or resin; the fumes of this, when burnt, blind the evil spirits.

8. *Pengelembut antu* (Pl. XVI, 1*c*). Portion of *lukai* bark, *Goniothalamus malayanus* (*Anonaceæ*). Burnt near the sick to weaken (*lembut*, to weaken) the attacks of the spirits. The fumes are very aromatic.

9. *Ubat endu busong* (Pl. XVI, 1*d*.) Part of a root, and part of the horn of *Cervulus muntjac* (Brooke), the muntjac or barking-deer. Medicine to prevent the infliction of supernatural punishment (*busong*). A man may not pronounce

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[1] Supplement to *Nature*, April 24, 1902, p. iv.

[2] *Enselua*, the soul. The use of this word is peculiar. If any article is missing, it is said to have been taken, if not by persons, by the soul of the owner of the missing article. *E.g.*, *Duku aku nyau nadai temu engka, udah diambi enselua*, "My chopper is gone, and I can't find it; perhaps it was taken by the soul." (Bailey and Howell, *Sea-Dyak Dictionary*, p. 43.)

the name of his father-in-law or mother-in-law without incurring the wrath of the spirits: since a Dyak reckons as fathers and mothers-in-law, not only his own wife's father and mother, and the fathers and mothers of his brothers' wives and sisters' husbands, but also the fathers and mothers of all his cousins; and further, since many Sea-Dyak proper names are words in everyday use, *e.g.*, *Tedong*=cobra; *Rimau*=tiger, leopard; *Jawa*=barley; *Jamban*=a bridge; *Bulan*=moon; *Panggau*=lucky, etc., it not infrequently happens that the *manang* in his incantations mentions a tabooed name; this charm is supposed to counteract the evil results that should by rights ensue. There are many other ways also by which a man may become *busong*.

10. *Batu penawar burong.* Pebbles; to counteract evil omens. A list of the mammals, birds and insects, employed by the Sea-Dyaks as omens, is given in Dr. Haddon's *Head-Hunters, Black, White and Brown.*

11. *Batu pemadu.* A water-worn pebble. *Pemadu* is from *badu*, "to come to an end," to cease, and with this charm the *manang* brings to an end his *pelian* ceremony; its use is to counteract any evil omens that may have been forgotten when No. 10 was used.

12. *Pemansut.* A portion of a betel-nut. This is grated into water, and the decoction is effective in removing thorns embedded in flesh. The word is derived from *pansut*, "to come out," "to cause to come out." As Mr. Bailey suggests, the *manang*, when applying this, is able to squeeze out the thorn, or to exhibit another one, with a little sleight-of-hand. (Compare Haddon's account of a Punan medicine-man, *l.c.*, p. 366.)

13. *Ubat enda batok.* A water-worn flint. Medicine for a cough.

14. *Ubat enda lusu.* A tarsal bone of *Cervulus muntjac* (*v.* No. 9 above). Powder from this, wrapped in a cloth and tied round the wrist or ankle, will soothe pain in the joints of the limbs.

15. *Batu enda penat tuboh* (Pl. XVI, 1*c*). A piece of igneous rock (syenite); a cure for weariness after a hard day's work; it is used like No. 14. Both these are apparently examples of sympathetic magic.

16. *Ubat muda beranak.* Knots of wood, a lump of clay, and a fragment of a tortoise's humerus; a mixture of powder from these, compounded with water and applied externally, is supposed to render child-birth easy.

17. *Ubat enda unggoi.* Part of a feather. Chips of this in water are given to sickly and stunted infants to make them grow.

18. *Ubat pemambar darah.* A small piece of wood. Medicine to induce blood to flow. *Pemambar* is from *pambar*, "to scatter." The *manang* supposes that in certain cases, *e.g.*, a developing abscess or carbuncle, the blood becomes congealed round the affected area. This medicine causes it to dissolve and flow through the veins and arteries in a natural way.

19. *Entimut* and *bigi jerangau.* *Entimut* wood (*Curcuma aromatica*, Salisb.), and slices of the root of *jerangau* (*Acorus gramineus*, Schott), threaded on a string like beads. A general prophylactic.

20. *Sumua penyakit tau sumua.* Odds and ends of bark, and knots of wood. A little of each in a mixture cures all diseases.

21. *Ubat enda mabok.* Molar of some small carnivore, a water-worn pebble, and a piece of mace. To sober a drunken man.

22. *Ubat sakit jugal.* Portion of a deer's antler. Medicine for a liver complaint due to distension of the gall-bladder.

II. Simples.

23. *Ubat enda nyengut.* A piece of bark. *Nyengut* is perhaps best rendered by peripheral neuritis.

24. *Ubat enda nyang.* Knots of wood. *Nyang* is an eruptive disease.[1]

25. *Ubat enda bira.* A knot of wood. A preventive of diarrhœa.

26. *Ubat sakit bengkak.* A knot of wood. Medicine for tumours.

27. *Ubat enda engkual.* A piece of bark. To stop vomiting.

28. *Ubat enda tara.* Fruit of *kapayang* (*Pangium edule*, Miq.). Medicine applied in cases of *prolapsus uteri.*

29. *Ubat enda rabus.* A bunch of sweet-smelling herbs, and a piece of *entimut* wood. *Rabus* is a disease known to medical science as *aphtha*, a form of thrush, caused by a fungus, *Öidium albicans.*

30. *Ubat enda kuyap.* Two pieces of bark. Medicine for shingles, *Herpes zoster.*

31. *Ubat enda betu.* Some lumps of red clay. These are mixed with water to form a paste, and smeared on to wounds produced by scalding.

32. *Ubat enda senampun.* Part of a betel-nut. *Senampun* is a whitlow. The betel-nut is ground up, mixed with cooked *pulut* rice (*Oryza glutinosa*), and applied as a poultice.

33. *Ubat enda sakit kemih.* *Tuba* root (*Derris elliptica*). Medicine for gonorrhœa.

34. *Ubat enda meliur.* Fruit of *ikau*, *Cocculus macrocarpus*, Wigh. (*Menispermaceæ*). *Meliur* means excessive discharge of saliva in infants, and is apparently regarded as an ailment by the Sea-Dyaks.

35. *Ubat enda bejuak.* Bark of *lawang*.[2] A preventive of colic. It will, of course, be clearly understood that a complaint such as colic might be attributed by the *manang* to evil spirits tearing the body of the sufferer, in which case some such a charm as *ubat kena betampal* would be used, but if the *manang* diagnosed the complaint correctly, he would use this simple, though perhaps in conjunction with a charm.

II. The *Lupong* from the Undup River.

The *lupong* from the Undup River (Pl. XVI, 2) is a cylindrical basket, or rather a box, made of *entli* wood, 29 centimetres in height, and 16 centimetres in diameter;

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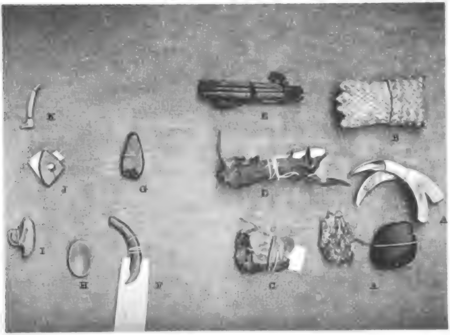
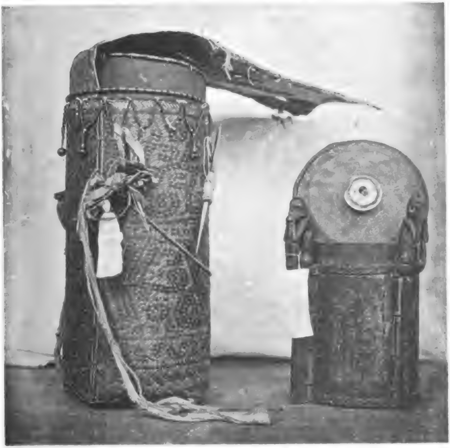
[1] It is quite possible that these pieces of bark and wood possess valuable astringent or antiseptic properties, but they are so fragmentary that I am not able to identify the plants from which they have been taken; I believe however that the *manang* is not particular in his choice. Still I hesitate to call these charms.

[2] I was never able to get the scientific name of this tree.



1. CONTENTS OF MEDICINE BASKETS.



2. MEDICINE BASKETS (*lupong*) FROM THE SARIBAS AND UNDUP RIVERS.

TWO MEDICINE BASKETS FROM SARAWAK.

it is closed by a tightly-fitting lid, which is provided on the top with a button made from the lid of a little china pot; two wooden upright handles, the upper ends carved to represent a squatting human figure (*pentik*), are attached to the box. The contents of the *lupong* are all charms, and are as follows. The numbers in brackets refer to the charms in the *lupong* from Saribas River.

1. *Batu ilau* (cf. No. 1). A water-worn crystal, enclosed in a bamboo cylinder. Several thorns are also enclosed with the quartz crystal.

2. *Engkraban* (cf. *ante*, p. 79). A small thorn wrapped up in a piece of cloth, and enclosed in a small cylinder of bamboo.

3. *Ubat endu pansa utai* (cf. No. 6). Some knots of wood.

4. *Penyampu* (cf. No. 5). A knot of wood, and a tendril of some creeper.

5. *Batu penabar.* Two water-worn stones, and a knot of wood. A charm to float a disease to the surface of the body, whereupon the *manang* can seize it.

6. *Taring* (Pl. XVI, 1*f*). A small boar's tush. This is used as a probe. When a dart from the blowpipe of Antu Gergasi (cf. p. 78) has entered the souls of the patient, its course must be traced with the *taring*, so that the *manang* may extract it, the operation causing no pain whatsoever.

7. *Bulu landak enggau buloh temiang.* Quill of a porcupine, and a slip of *temiang*, bamboo (*Bambusa wrayi*). This is a charm against the ill effects produced by people who are *tau tepang*, *i.e.*, possessed of the evil eye, people who "overlook" others. Mr. Bailey notes "there are many *tau tepang* persons, and people are very shy of having dealings with them, or of marrying into their families."

8. *Batu penchelap* (Pl. XVI, 1*g*). A water-worn stone, and a mass of quartz crystals. The stones are immersed in water, and the water rubbed on to the patient's body as a universal remedy and preventive.

9. *Batu bliong* (Pl. XVI, 1*i*). A small clay model of an axe-head (*bliong*). Used to hack diseases out of the patient's body. A very rare charm.

10. *Batu prauh penimba* (Pl. XVI, 1*h*). A small clay model of the baling-vessel used in a boat. Used to bale diseases away.

11. *Batu bulang balik* (Pl. XVI, 1*j*). A small triangular block of clay, perforated by a hole in the centre. A very rare charm which enables the *manang* to visit the Sea-Dyak equivalent of Hades (*Sabayan*) and return to earth again (cf. No. 2).

12. *Batu burong undan* (Pl. XVI, 1*k*). The *undan*-bird stone, a rough miniature model of a bird. The *undan* appears to be any large coastal bird, such as a reef-heron or a pelican. The charm secures the presence and help of a friendly spirit[1] who takes the form of a *burong undan*, and who has power to enable the *manang* to get quickly to *Sabayan* (Hades) when he desires to go there in search of a sick man's soul.

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[1] This spirit seems to correspond with Archdeacon Perham's description (see Ling Roth's *Natives of Sarawak*, etc., vol. i, pp. 168–191) of the *Petara* or friendly spirits as opposed to the *Antu* or evil spirits. Dr. C. Hose informs me that the *burong undan* is often invoked in Sea-Dyak incantations; but I can find no reference to it in any of the songs and incantations quoted by Archdeacon Perham and Messrs. Bailey and Howell.

CONTRIBUTIONS TO EGYPTIAN ANTHROPOLOGY: TATUING.

BY CHARLES S. MYERS, M.A., M.D.

[PRESENTED NOVEMBER 25TH, 1902. WITH PLATES XVII, XVIII.][1]

GENERAL INTRODUCTION.

THE material, upon which this study has been based, was collected by me during the autumn, winter and spring of the years 1901–2. For financial assistance, I am indebted to the Government Grants Committee of the Royal Society and to the British Association for the Advancement of Science. My work was confined to the privates and non-commissioned officers of the Egyptian army; Sir F. R. Wingate, K.C.B., etc., Sirdar of the Army, having kindly placed at my disposal as many Egyptian and Sudanese troops as I could examine during my visit. For four months I remained at Abbasia, a suburb of Cairo, where I was able to make anthropological investigations upon one thousand and six Egyptian conscripts. Later I went to the Sudan, staying about six weeks at Khartum and Omdurman, where I examined one hundred and eighty-nine soldiers of the Sudanese regiments quartered there. My hearty thanks are due to the Sirdar, and to many of his staff for the assistance, attention and hospitality, which I received from them repeatedly in the course of my work. In various ways, I am also indebted to other officials of the Egyptian Government, more particularly to Sir William Garstin, K.C.B., Captain H. G. Lyons, R.E., and Mr. B. H. Wade.

The object of my work was to determine by descriptive, metric, and photographic methods, what differences, if any, exist (1) between the modern Mahommedan and Coptic[2] populations; (2) between the inhabitants of various parts of Egypt; and (3) between the ancient and the modern Egyptians. In one respect, the material at my disposal was unsatisfactory for such an inquiry. The enlisted conscripts were a picked body of men, measuring at least 170 centimetres in stature, and at least 87 centimetres in chest circumference. There is, however, no reason to believe that my investigations will be vitiated by the selection to which the Egyptians had thus been subjected. The average stature of the people has not materially changed since the earliest times of which we have any record, *i.e.*, since about 6000 B.C. We have no historic evidence of shorter folk, living in the immediate neighbourhood, who by infiltration could have influenced the ethnology of Egypt. Nor does an examination of the oldest Egyptian skeletons reveal the more frequent association of any one ethnic character with individuals of smaller stature than with those of greater stature.

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[1] Figs. 21–24, 26, 28–30, 33–35 in Pl. XVIII are here reproduced by kind permission of the authors of the papers in which they were first published: *see* Explanation of Plates, p. 89.

[2] Egypt was officially proclaimed a Christian country in the reign of Theodosius I, 308 A.D., and remained so until the Moslem invasion of 640 A.D. The Copts are the small section of Egyptians who, refusing to embrace Mahommedanism, have continued to this day steadfast in the former religion.

In addition to this material, I have measurements (α) on some sixteen Copts taken by Mr. Randall-MacIver and myself at a *deir* (monastery) near Araba in the province of Girga, and (β) on eighteen inhabitants of the oasis of Khargeh which I visited in April, 1901.[1] I have also measurements (γ) of fifteen *fellahin* of the province of Ḳena, taken by Mr. Randall-MacIver and by my fellow-traveller, the late Mr. Anthony Wilkin, which the former has had the kindness to hand over to me, together with a few portrait-negatives of the individuals examined.

The birthplace and religion of every soldier examined, and of his parents, were recorded. Forty-nine measurements were selected, about sixteen of which were made on each individual. More than seventeen thousand measurements were in this way collected. Photographs (full-face and profile) were taken of one hundred and seventy-six Egyptians, and of thirty-one Sudanese; their heads preserve a constant distance from the camera, so that the negatives may be of use for composite portraiture. The colour of the skin and eyes, the colour and texture of the hair, the general shape of the face, lips, nostrils, nose, eyes, and of the head viewed from above, from behind, and from the side, were recorded. Numerous observations were made on the relative degrees of development of the helix, antihelix, tragus, lobe, etc., in the Egyptian, and in the Sudanese ear.

The soldiers were classified according to the birthplace of their parents. Where the names of two provinces are given, connected with a hyphen, the first is the father's, the second the mother's province.

Only forty-four Copts were examined in the army. The others were Moslems, comprising four hundred and eighty-four men who belonged to the provinces of the Delta, viz., Ḳaliubia, Sharḳia, Daḳahlia, Gharbia, Menufia and Beheira, four hundred and one men from the more southern provinces of Giza, the Fayum oasis, Beni-Suef Minia, Assiut, Girga, Ḳena, and Assuan, and some seventy-seven of mixed or uncertain origin.

The majority of the Sudanese came from Kordofan, Dar-fur, Dar-nuba, Dar-fertid, or belonged to the Shilluk or Dinka tribes. Some hailed from Bagirmi, Dar-runga, Banda, Bongo, Burun, Berta, or even from Bornu, Baia and Uganda. Others belonged to the Niam-niam, Neur, Hamaga, or Diga tribes. A few Arab tribes of the Sudan and eastern desert were also examined.

The Tatu-marks of the Modern Egyptians.

The two commonest designs are illustrated in Pl. XVII, 1 and 6. They are known as طرز, *i.e.*, the type or pattern. The former (Fig. 1) is inscribed on one or both temples, and is met with not only among the *fellahin* of Egypt, but among the Bedawin of the desert. Occasionally, three small vertical scars may be made instead of this pattern; other modifications are shown in Figs. 2 and 4. The latter (Fig. 6) occurs on the arm, wrist, or extensor surface of the hand, most commonly on the right limb. Varieties of the same design are shown in Figs. 7, 9, 10. A typical specimen of a well-tatued hand is shown in Fig. 11. These patterns may be all resolved into dots, circles, straight lines and V's. A few were tatued with dots on the chest or back (Fig. 5).

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[1] Cf. *Man*, 1901, 91.

Besides these geometrical figures, tatu-pictures of animate and inanimate objects were also met with. The forearm or hand often bore the design of a fish or of two fishes lying across one another, in one instance supporting a branch. Pl. XVII, 14, appears to be the degenerate pattern of two fishes lying side by side. Next in frequency, according to my experience, came a lion grasping a sword (Pl. XVII, 15) Scarcely less common was the figure of a woman, often holding either a wand, a serpent, or a basket of flowers. I also met with several examples of the tatuing of a mosque on the flexor surface of the arm. It had always a central dome and two lateral minarets (Pl. XVII, 17, Pl. XVIII, 32, 36). The hoopoo, a bird known to the Arabs and Egyptians as هبهب (= heb-heb), appears in Pl. XVII, 16. Among the rarer patterns were the three-stemmed plant (Pl. XVIII, 18), the cock and the camel. All the above occurred on the arm or wrist. The star and crescent were of common occurrence. In Pl. XVIII, 23, they are shown in company with what were described to me as being ears of corn. The crescent crowns the dome in the mosque-designs, and the middle leaf in the plant-designs. Sometimes a man's name or a Koranic text is also tatued on his arm, in spite of Mahommed's well-known commands apparently forbidding such practices as have been just described.

These tatu-marks were met with among ninety-five of three hundred and seventy-five Egyptians in whom they were specially looked for; in other words, one Egyptian in four was tatued. They were slightly commoner (30 per cent.: 20 per cent.), and certainly more elaborate, in Lower than in Upper Egypt, and were not confined to, nor absent in, any one province or district. It is suggestive, however, that they appeared more frequently among the inhabitants of the western, than among those of the more eastern provinces of the Delta.

Western side.	Number tatued.	Number examined.	Percentage tatued.	Eastern side.	Number tatued.	Number examined.	Percentage tatued.
Beheira ...	13	29	45	**Dakahlia ....**	6	43	14
Gharbia ..	17	44	39	**Sharkia ....**	1	10	10
Kaliubia	4	15	27				
Menufia ...	12	46	26				

With a single exception, the above designs were obtained solely from Mahommedans. Only one of the seventeen Copts, in whom such tatu-marks were looked for, bore them. The Copts, however, are by no means ignorant of the art. They frequently tatu themselves with a cross (Pl. XVIII, 27) on the wrist or arm. An elaborate pattern, copied by me from the arm of a Coptic priest, who had twice made a pilgrimage to the *Beit el makḍdis* (as he termed it) of Jerusalem, is shown in Fig. 31,[1] and a design, observed by Fouquet[2] on a Copt, in Pl. XVIII, 28.

The peculiar distribution of tatuing, suggested by the above table, might lead one to suspect that the art has been introduced into Egypt from its western or Libyan side. We may, therefore, briefly institute a comparison between the tatu-marks of Algiers and Morocco and those of Egypt. The tatu-marks of Algiers have been elaborately studied by d'Hercourt[3] and by Jacquot.[4] It appears that both the Arabs and Kabyles tatu, and that no one pattern is confined to any particular tribe or family. The operation is performed by the mother on her child, often for mere decoration's sake, at other times to ward off or to cure disease. Their tatu-patterns often reappear in native embroidery. Most of the designs are geometrical, and it is well worthy of note that the cross, pure or complicated with the diamond and other angular figures, is exceedingly common in this Mahommedan country. Through the kindness of Mr. W. B. Harris and Mrs. Talcott Williams I have been able to compare numerous Moorish tatu-patterns with the Algerian; the resemblance between them is remarkably close, and both bear a distinct likeness to some of the more purely geometrical patterns of modern Egypt.

Now the Copts of Egypt still tatu their children, while the Egyptian Moslems, as will be seen, call in an alien people to perform the operation. The cross, which is by far the most usual design among the Copts, occurs now and again also among the Egyptian Moslems (Pl. XVII, 8). There is hence a possibility that in pre-Christian times it was widely spread throughout North Africa, and that, devoid of later religious meaning, it still survives among the Algerian Moslems.

Attention may be specially drawn to the design of the crested bird, observed by Jacquot, and to that of the plant growing in its pot. A leaf-bearing stem is also met with in Algiers, and apparently degenerates into one of the commonest of their geometrical patterns.

This prevalence of Egyptian-like tatuing, not only among the Arabs, but also among the Kabyles or Berbers, who are generally considered to be the modern representatives of the ancient Libyans, makes worthy of mention the fact that on the walls of the tomb of the eighteenth dynasty king, Seti I,[5] Libyans are represented, tatued or painted with diamond-shaped, oblong, and cruciform designs (Pl. XVIII, 33, 34, 35).

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[1] Italian pilgrims to Jerusalem used to be tatued in like fashion (E. Verrier, *Du Tatouage en Afrique*, Paris, 1895, pp. 26, 27). W. Jörst (Tatöwiren, Berlin, 1887, S. 103) quotes Procopius' testimony that very many Christians burnt the name of Christ (*curare inuri sibi*) or the sign of the cross into their palms or arms; so also did the crusaders.

[2] *Archives d'Anthropologie criminelle*, Paris et Lyon, 1898, tome xiii, p. 274.

[3] *Mémoires de la Soc. d'Anthropologie de Paris*, 1868, tome iii, pp. 1-24.

[4] *L'Anthropologie*, 1899, tome x, pp. 430–438.

[5] *Ippolito Rosellini, Monumenti dell' Egitto e della Nubia*, Pisa, 1832, tome i, tav. CLVI.

The question, naturally, arises whether the modern practice of Egyptian tatuing is of comparatively late introduction from North Africa, or from some other region, or whether it is not rather the survival of a long established custom of the country. De Morgan is of opinion that "tatuing was frequent in Libya, while absent in Egypt. It is only in the reign of Amenophis IV, a period when, moreover, we find other signs of Libyan influence, that the king and queen had the name of the god Aten tatued on their bodies."[1] After a survey of the evidence we must, I think, conclude that tatuing was never general in ancient Egypt. It is true that Fouquet,[2] when unwrapping the mummy of a Theban priestess (the Lady Ament) who lived in the eleventh dynasty, observed many white and blue *ante mortem* linear "cicatrices" on the abdomen and elsewhere; whence he concludes that the priestess had been treated for chronic pelvic peritonitis in a manner still practised among the *fellahin* of the present day.[3] But such linear scarification is far removed from the elaborate patterns described and figured in this paper. It is also true that Petrie and Quibell[4] discovered a white clay figure of a woman in their "prehistoric" graves near Naḳada, painted with black designs, the most striking of which I reproduce (Pl. XVIII, 26, 29, 30). But it would be unwise to set too great store by this single example. Surely, knowing how faithfully the ancient Egyptian artists portrayed the customs, dress, and physiognomy of their contemporaries upon the walls of tombs and temples, we might reasonably expect to find many paintings of peasants or nobles bearing tatu-marks, if the practice had been at all general. Yet the few unsatisfactory instances, which I have quoted, are all the evidence that we possess, in spite of the wealth of material at our command.

If we admit, as is most probable, that the medicinal use of linear scars and of linear tatu-marks is of very ancient date in Egypt, are we then to suppose that the complex and decorative modern patterns have a Libyan and later origin? It is likely that the more geometrical of them have been thus derived. But having regard to the designs of the armed lion, the doubly minaretted mosque, the crescent, star, etc., we are rather led to extend our inquiries elsewhere.

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[1] J. de Morgan. *Recherches sur les Origines de l'Egypte. Ethnographie Préhistorique.* Paris, 1897, p. 222.

[2] *Op. cit.*

[3] My friend, Mr. J. Garstang, writes to me from Beni Hassan:—"Among my workmen tatuing is practised, (*a*) for ornamentation, (*b*) in order to allay pain. I do not find that they have any particular notion how: they recite no charm, but believe in its efficiency . . . The pattern in this case is usually composed of dots over the seat of the pain, *e.g.*, over the wrist joint after a sprain."

[4] *Naqada and Ballas.* London 1896, Plate 59. Petrie (*L'Anthropologie*, 1900, tome xi, pp. 485, 486) considers that the resemblance of the designs on this figure to those described by Jacquot in Algiers, and to those of the Libyans in the tomb of Seti I, is very striking. I cannot agree with him.

The method of tatuing (called *daḳḳ*, دقّ = to knock) which is employed in modern Egypt, has been well described by Fouquet.[1] An inquiry among the Moslem *fellahin* showed me that they were tatued, not by their fellow countrymen, but by certain alien wandering tribes who have a language of their own, and are said to trace their descent from further east. The Egyptians, like the Algerians, are generally (but not universally) tatued during infancy. Mothers take their babies to be operated on, according to some for the sake of ornamentation, according to others in order to ward off the evil eye and disease. (Even the Copts tatu the cross, in many cases, at least, on account of sickness.[2]) Some told me that the Ghagar, others that the Ghawazi were the people who undertake the tatuing, often using at the ceremony words of which the *fellahin* cannot understand the meaning. Less detailed evidence was long ago gathered by Lane,[3] but he appears to have been acquainted only with the relatively simple designs (dots, circles, and lines) met with among the Egyptian women. He gives the street-cry of the Ghagar wanderers in Cairo, ندقّ ونطاهر "we tatu and circumcise."[4] Fouquet observes, "elles traversent les quartiers indigènes en criant à haute voix leur industrie: 'Faire les tatouages, percer les oreilles, et couper les clitoris.' La langue arabe, comme le latin, n'a point les pudeurs du francais."[5] Of the Ghawazi, Lane writes that "we can hardly doubt that they are, as they themselves assert, a distinct race. Their origin, however, is involved in much uncertainty. They call themselves 'Barámikeh,' or 'Barmekées'; and boast that they are descended from the famous family of that name . . . . , of whom we read in several of the tales of 'The Thousand and One Nights.'" "There are but few gypsies in this country. They are here called 'Ghagar or Ghajar' . . . . ."[6] It is said that the "gypsies" in Egypt often pretend to be descended from a branch of the same family to whom the Ghawazi refer their origin.

The tatuing performed on the Egyptians by the Ghagar folk is likewise referred to in the interesting paper on the Gypsies of Egypt by the late Captain Newbold, F.R.S.[7] We are there told that in customs, physiognomy, and language, the Ghagars resemble the Kurbáts (or "gypsies") of Syria,[8] that their numerals are for the most part of Persian or Indian origin, that one of their tribes is called "Romini" (?=Romany), and that they claim to have brethren in "Hongarieh" (?=Hungary).

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[1] *Op. cit.*

[2] However Stern, quoted by Fletcher (*Trans. Washington Anthrop. Soc.*, 1892, p. 58), states that the Arab invaders branded the Coptic monks with the cross.

[3] *An Account of the Manners and Customs of the Modern Egyptians*, London, 1846, vol. i, pp. 64–67. There are also a few references to the practice in W. H. Yates' *Modern History and Condition of Egypt.* London, 1843, vol. ii, pp. 224, 236.

[4] *Ibid.*, vol. ii, p. 235.

[5] *C. R. de l'Acad. des Sci.*, 1897, tome cxxiv, p. 1179.

[6] *Op. cit.*, vol. ii, pp. 226, 234.

[7] *Journ. Roy. Asiat. Soc.*, 1856, vol. xvi, p. 285 ff.

[8] Attention may here be drawn to a reference by Lucian (*De Deabus Syriorum*, 54) to the scarification-marks which the Syrians of his time made upon their skin.

There is also evidence that vagrant tribes in other parts of the world perform the same office. Dr. Mitra,[1] writing on the Bediya folk, whom he describes as the gypsies of Bengal, observes that they are skilful in tatuing, "an art unknown to all in Bengal except the Bediyánis." "Young girls are their principal patrons, and they generally get themselves tattooed between the eyebrows or below the under lip. Sometimes the breasts and the forearms are also subjected to the operation."

An interesting series of tatu-designs of the Dômbs of Jeypur, Madras, a primitive jungle people, has been published lately by Fawcett.[2] They are composed of dots, circles, straight lines, zig-zags and crescents, and are, at least, as much like the geometrical tatu-marks of the modern Egyptians as are those of the ancient Libyans.[3] The Dômbs are tatued by Gojias, an interesting fact when brought into relation with our knowledge of the tatuers of Bengal and of Egypt. Risley[4] has sought to connect these Dômbs with the Dôms of Upper India, who, according to Leland,[5] are a gypsy race, related to the Domarr, who still speak a "pure Romany" tongue.

An attempt has been made to show that the languages of the Bediya of Bengal and of the Ghagar of Egypt likewise contain traces of Romany, and that tatuing is known also to the gypsies of France and of England.[6] The evidence, however, is extremely unsatisfactory; and, even were the latter thesis proved, we cannot forget that tatuing was probably a widespread custom in primitive Europe, and that the wandering tribes, who perpetuate it, may have learned the practice from very different sources.

Looking to the language and legends of the Ghagar, we can scarcely doubt that modern Egyptian tatuing has received encouragement, even if it has not been derived, from the similar customs of more eastern peoples. We can thus understand the origin of various designs which are certainly not Egyptian. The lion grasping the sword (Pl. XVII, 15) is of relatively modern Persian derivation. The mosque with two minarets (Pl. XVII, 17) is exceedingly uncommon in Egypt, but is often found in Turkey, Persia, and farther east. The crescent and star, although employed occasionally in ancient Egypt, are very typical of Chaldæan and Assyrian designs. The three-stemmed plant (Pl. XVIII, 18), so far as I know, is not an Egyptian design. It is curious to find a similar plant surmounted by the crescent in a Chaldæan contract (Pl. XVIII, 20), and precisely the same disposition of birds and crescent in the gold model of a sanctuary from Mycenæ (Pl. XVIII, 22). Pl. XVIII, 19, may be a degraded copy of the

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[1] *Memoirs of the Anthrop. Soc. of London*, 1870, vol. iii, pp. 120–133.

[2] *Man*, 1901, 29.

[3] Mr. Ling Roth, who has long been at work collecting tatu-designs from all parts of the world, independently observed how close a general resemblance my Egyptian simpler forms bore to his Indian patterns.

[4] *Man*, 1902, 74.

[5] *The Gypsies.* London, 1882, pp. 333, 334.

[6] David Mac Ritchie: *Accounts of the Gypsies of India.* London, 1886, pp. 88, 234–237.

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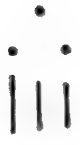
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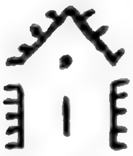
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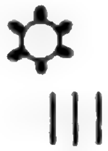
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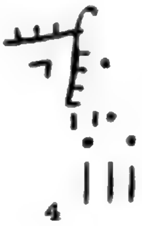
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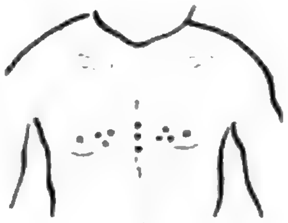
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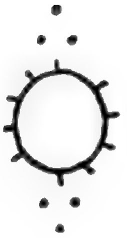
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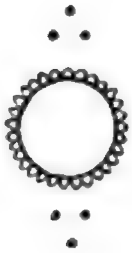
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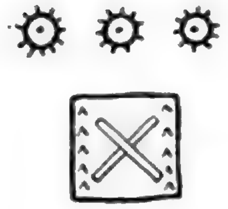
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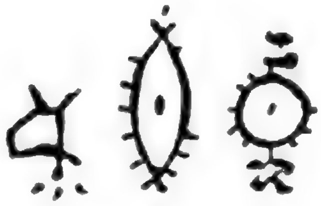
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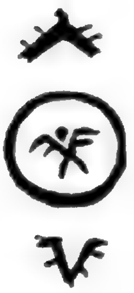
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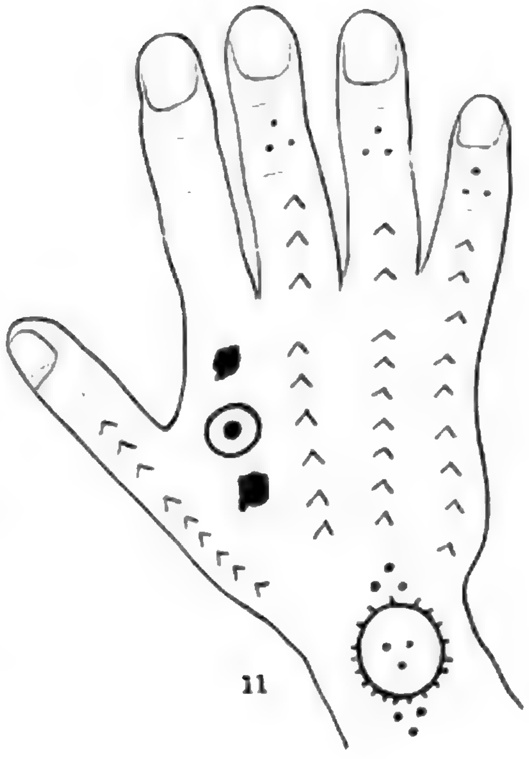
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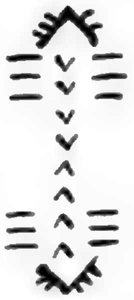
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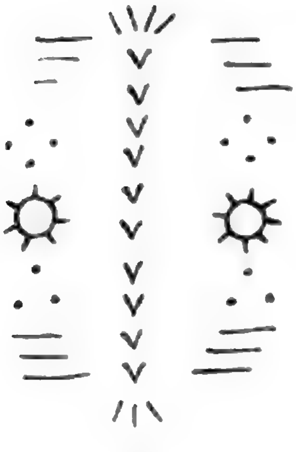
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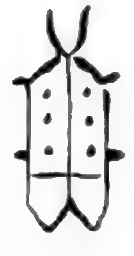
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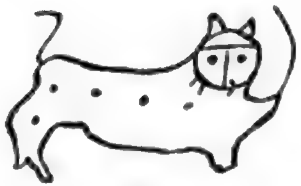
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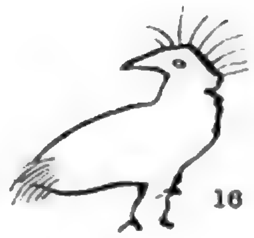
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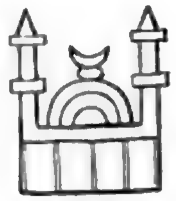
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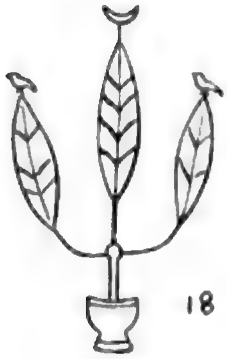
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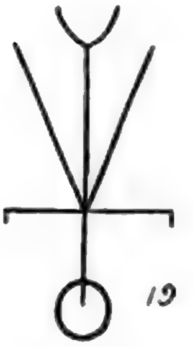
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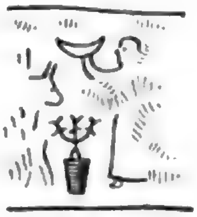
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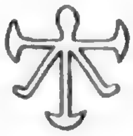
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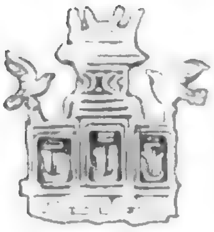
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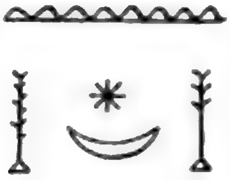
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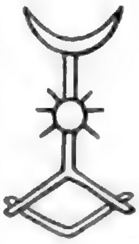
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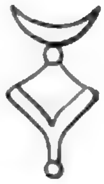
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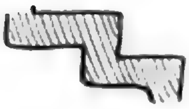
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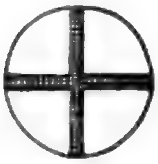
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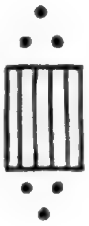
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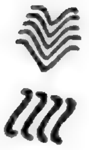
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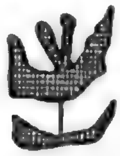
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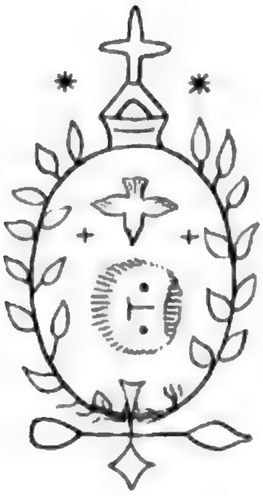
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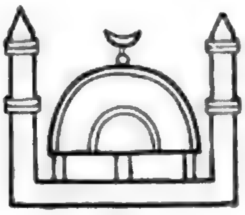
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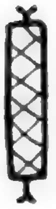
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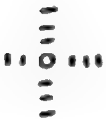
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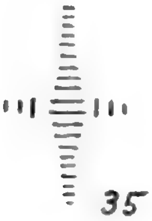
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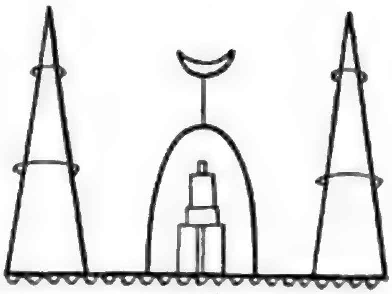
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CONTRIBUTIONS TO EGYPTIAN ANTHROPOLOGY: TATUING.

three-stemmed plant; but, when inverted, it is singularly like a device (Pl. XVIII, 21) met with on a ring from the Vapheio tomb near Sparta, which, it has been conjectured, is derived from the well-known Egyptian symbol, the *Ankh*. Again, the hoopoo, according to Wilkinson, was never a sacred bird in ancient Egypt, although it seems to have been "respected." In Palestine and Arabia, on the other hand, it was an object of great veneration. The hoopoo (mistranslated "lapwing" in the authorized version) was one of the forbidden articles of food among the Hebrews (Lev. xi, 19; Deut. xiv, 18). It was sent by Solomon to interview the Queen of Sheba, according to the late Jewish legend, incorporated by Mahommed into the Koran (chap. 27, "The Ant"). At the present day, the "Arabs" of Palestine call the hoopoo the doctor, and its head is "an indispensable ingredient in all charms."[1] In modern Egypt the heart of this bird has come to be used similarly for the curing of certain diseases. Lastly, the Egyptian tatu-pattern (Pl. XVIII, 25) may be compared with the Mesopotamian design (Pl. XVIII, 24).

It appears, then, that the simpler and more purely geometrical patterns of modern Egyptian tatuing are akin to those which prevail throughout northern Africa, while the more complex have been derived from an Eastern source.

Explanation of Plates.

All the figures in Plate XVII, and Figs. 18, 19, 23, 25, 32, 36, in Plate XVIII, are specimens of modern Moslem Egyptian tatuing. The *provenance* of the various designs is here given, numbers in brackets referring to the card-numbers of the *fellahin* who were examined.

Plate XVII,	Fig.	1.	Assiut	(846)
"	"	2.	Menufia	(882)
"	"	3.	Gharbia	(802)
"	"	4.	Girga	(625)
"	"	5.	Ḳaliubia	(908)
"	"	6.	Ḳaliubia	(764)
"	"	7.	Ḳena	(858)
"	"	8.	Fayum	(859)
"	"	9.	Beheira	(977)
"	"	10.	? Gharbia	(986)
,	"	11.	Beheira	(981)
"	"	12.	Menufia	(703)
Plate XVII,	Fig.	13.	Fayum	(884)
"	"	14.	Beheira	(977)
"	"	15.	Daḳahlia-Fayum	(997)
"	"	16.	Alexandria	(734)
"	"	17.	Menufia	(698)
Plate XVIII,	"	18.	Daḳahlia	(889)
"	"	19.	Beheira	(981)
"	"	23.	Ḳaliubia	(764)
"	"	25.	Menufia	(304)
"	"	32.	?	?
"	"	36.	Assiut	(647)

In Plate XVIII, Figs. 27, 28, 31, were obtained from Copts. Fig. 31 had been tatued in Jerusalem. Fig. 28 was observed by Fouquet (*loc. cit.*).

Figs. 26, 29, 30, are from an early Egyptian painted white clay figure, discovered by Petrie and Quibell (loc. cit.).

Figs. 33–35 are from designs on Libyans from the tomb of Seti I (Rosellini, *op. cit.*).

Fig. 20 is a design from a Chaldæan contract. (*Arch. des Missions Scientifiques*, 1880; Tome vi, p. 94).

Fig. 21 appears in a design on a gold signet-ring from the Vapheio tomb (A. J. Evans, *Mycenean Tree and Pillar Cult*, London, 1901, Figs. 52, 54).

Fig. 22. Gold Shrine with Doves; Third Akropolis Grave, Mycenæ (from Schliemann's *Mycenæ*; here copied from A. J. Evans, *op. cit.*, Fig. 65).

Fig. 24. From a Mesopotamian cylinder (*Collection de Clerq*, tome i, pl. xxxi, Fig. 330; here copied from d'Alviella, *Migration of Symbols*, London, 1894, Fig. 140).

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[1] Rev. H. B. Tristram, *The Ibis*, 1859, vol. i, p. 27.

A TOTEM POLE IN THE BRITISH MUSEUM.

[WITH PLATES XIX, XX.]

BY T. A. JOYCE, B.A.

THE Ethnographical Collection at the British Museum has recently been enriched by the acquisition of a totem pole from the Haida Village of Kayang near Masset, Queen Charlotte Island.

The pole (Pl. XIX) is 39 feet high, carved from a cedar trunk, and hollowed out at the back to reduce the weight. Unfortunately, it is somewhat weathered, and consequently all traces of the paint, with which it was probably covered, have disappeared. The value of the specimen is considerably increased by the fact that it is accompanied by a legend, taken down from the lips of the chief Weah of Masset, through the medium of the Chinook language, by Mr. C. J. Newcombe, M.D., to whom I am indebted for the story.

The interest attaching to this particular pole is further enhanced by the following fact. In 1898, the British Museum acquired through the agency of the Rev. J. H. Keen, missionary at Masset, a very finely made and complete model of an Indian house with its totem pole carved and painted in approved fashion by a native workman. With the model, Mr. Keen also sent the story supposed to be represented by the figures on the pole. By a peculiar coincidence, the pole of this model is an exact facsimile of the more recently acquired and full size pole from Kayang, with the exception of one small particular at the base. The difference is this. At the base of the large pole is the figure of an animal, of whose identity more anon, squatting on his haunches and holding in his mouth the tail of a whale, the head of which rests upon his two hind feet. In the model pole, immediately under the chin of this animal and cutting into his lower lip, is a circular hole forming the entrance to the house; there is no trace of a tail in his mouth, and between his hind feet appears the head of some small animal, somewhat similar to that of the frog (Tlamkostan).

It always seems worth while placing on record the legends connected with these totem poles, since, apart from their intrinsic interest, the introduction of civilization has given the natives of the North West Coast other ideas to strive after than the erection of carved columns to celebrate their names; the custom has almost, if not quite, fallen into decay, and the legends are being rapidly forgotten. In the present case, a comparison of the two legends illustrated by poles of almost identical design may afford additional interest.

I will first give the legend of the large pole from Kayang as obtained by Mr. Newcombe from the chief Weah.

Legend of the Totem Pole from Kayang, near Masset, Queen Charlotte Island, now in the British Museum.

1. Although the Raven (Yētl) had been originally the creator of all things, yet in after times he often had great trouble in procuring enough to satisfy his personal wants, and frequently had to go hungry. On one of these occasions, he imitated a friend of his, a famous wizard,[1] who was able to swim in the sea like a fish. He dived into the sea, and swam deep down until he reached the neighbourhood of a large village, where the inhabitants were fishing for halibut. Keeping himself well out of sight, Yētl commenced helping himself to the fish on the hooks as fast as they were caught. The fishermen became troubled at the constant loss, not only of their fish, but also of their hooks, which were of the ordinary type used for halibut, and at last one of them determined to try a hook of another shape, consisting of a straight wooden shank with a bone barb on each side (see Pl. XX, 3, a specimen from the Vancouver collection in the British Museum. Smaller hooks of this type are, according to Mr. Niblack,[2] used as jigs, when the fish are numerous. This form of hook is now almost entirely obsolete, though it is often mentioned in the old stories.) It was baited with a piece of the arm of a devil-fish, and let down with a stone sinker. Soon there came a strong bite; when the line was pulled, great resistance was experienced, and the line was dragged hither and thither for a long time. Several other fishermen joined in, and by their united efforts dragged the hook up as far as the bottom of the canoe but no farther, since Yētl (for it was he who had been caught) was holding tight to the sea bed with his claws. Suddenly the line slackened, and the men fell back. When they pulled it in, they found on the hook the upper part of the Raven's beak, but none of them could guess what it was. Later, when the fishermen were sitting together, Yētl, taking human shape, entered the house, and seated himself among the wise men, taking care however to conceal the lower part of his face. Trying to speak, all he could say was "Káguskūnt," a word which is mere gibberish. Pretending not to know what the piece of beak was, he induced the wise men to let him have it, and keeping firm hold of it, replaced it. Directly it fitted, he flew away through the smoke-hole in the roof, and went to another village. Later, however, he again became hungry, so he concealed his nose, which had not yet healed, and once more took the shape of a man; then, armed with the chief's staff (Tūśkexiekina), he sat down among the head men, and ate with them, and proved his wisdom by his talk.

The figure on the summit of the pole represents Yētl disguised as a chief with the hat (Tadn Skillik) and staff (Tūškexiekina). The second figure represents Yētl with his broken beak. (The flattened portion is actually a trifle larger, and the flattening a trifle more pronounced than appears from the sketch.)

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[1] Possibly Txämsem, for whom see later.

[2] *Smithsonian Report*, 1888. "The Coast Indians of Southern Alaska and Northern British Columbia," Plate XXX.

II. Long ago, there lived in a large town a young man who was always gambling at Sin (the game played with a number of short sticks described by Niblack, *Coast Indians, etc.*, p. 343). He soon lost all his property, and thought to improve his position by marrying the daughter of a wealthy chief. In this project he was successful, but as he continued to gamble he soon became as poor as before.

One night, coming home very hungry, he took up a piece of dried halibut and commenced tearing pieces off with his teeth. This made a peculiar ripping sound, and his wife's mother, who was not fond of him, put him to shame before the whole house by saying that he was splitting himself by his greediness, just as men split a piece of wood with a wedge when making canoe thwarts. The man choked with vexation, stopped eating, and nearly wept. Early next morning he went off into the forest alone and ate "devil's club" stems (jītlīnjaos, *Panax Horridum*),[1] just as the Haida eat fireweed (K'liēl, *Epilobium Spicatum*). After a prolonged course of this diet, he developed supernatural powers like a Shaman or S'haga. One night he went down to the beach and began to wish that a whale might come ashore, and soon this happened at the very place where he was sitting. He then rose up, cut a hole in the whale and got inside. The whale swam away and stranded opposite the centre of the town.

In the meantime, while this was happening, his wife's mother, who was herself a powerful Shaman, had a dream in which she saw a fine whale come ashore right opposite the village. In the morning she put on her Shaman's attire, took her magic rattles, *Klīnuñ* (Pl. XX, 2).[2] She then called all her neighbours together, told them of her dream, and they all drank warm sea-water. They then went to the beach and found the whale; but when they were about to divide it amongst them, the woman said, "Do not cut it up yet, we must first dance upon it." This they did, the woman using her rattles, the others drumming with sticks, and all singing. When the dance was over they cut the whale, just, as it happened, over the part where the man lay hid. He stood up so that all saw him, and his wife's mother was so ashamed that she cried. The others were glad and kept the story, which has been handed down to this day.

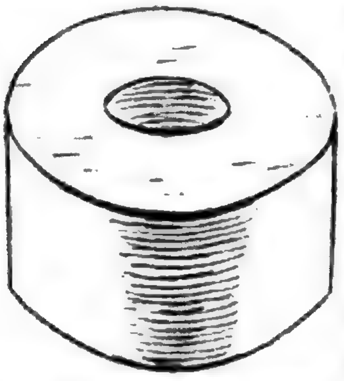

FIG. 1.—RATTLE OF UNUSUAL SHAPE.

The third figure represents the wife's mother with her Shaman's headdress and rattles.

The fourth figure is a crest showing the sea-bear (Chaᶜkun Huts) eating:—

The sixth figure, a young whale (Kūn).

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[1] Compare *Tsimshian Texts*, Smithsonian Institution. *Publications of the Bureau of American Ethnology, Bull.* xxvii. Prof. Franz Boaz. A chief drinks a decoction of Devil's Clubs to purify himself before giving a potlatch.

[2] Mr. Newcombe says the rattles held by the third figure on the pole are "of uncommon shape, made of two concentric cylinders of thin wood, covered above and below, and containing small pebbles between them" (Fig. 1). But after a study of the carving on the pole, I am inclined to think that they are of the old type, constructed of two concentric hoops of wood to which are attached a single or double row of puffin-beaks.

I have given the legend of the Raven Yētl in full, although practically the same story has been published by Professor Boaz.[1]

In the latter case, the fishermen's hooks were plundered by a certain wizard named Txämsem, to whom reference seems to be made above—a rather comic character with a fondness for stealing. In this case, the object hauled up was Txämsem's lower jaw and beard. A still closer parallel is found in the story of the Raven or Crow *Hooyeh* and the Fisherman *Hooskana* related by Niblack.[2]

The story accompanying the model pole, collected by Mr. Keen, runs as under; I give it in full because it differs considerably in detail from that related above.

Legend of the Model Totem Pole from Masset, Queen Charlotte Island.

The top figure represents NEngKilstlas,[3] a mythical hero of the Haida, and nephew of a chief of the same name, who was the creator of all things. This young man could assume any shape he liked, but his favourite form was that of the raven (hence the raven's head and wings), but he sometimes made himself appear as an old man with conjurer's hat and staff as here represented.

The fifth figure on the pole is that of a young man, name unknown, who married and lived with his wife's parents. One day his mother-in-law (the third figure, with labret, *Stuie*, and puffin-beak rattles) heard him eating dried salmon in bed and reproached him with laziness. He was much irritated by her reproaches, and next day took a stone adze, went to the shore of a lake in the woods, and cut down a red cedar so that it fell into the lake. He then returned to the village, caught one of a group of children and killed it. Coming back to the lake, he made a rope of cedar bark and tied it to the body of the child. Then he split open the head of the tree which overhung the lake and wedged it, thus constructing a large fork, between the prongs of which he dropped the body of the child. Before long this human bait was taken by a huge mouse; this he drew up, and then knocked out the wedge so that the fork closed upon his prey and killed it.

After skinning it, he dressed himself in the hide and went out into the sea hunting for whales, several of which he caught and killed.

Meanwhile his mother-in-law had become a conjurer, and one day she saw her son-in-law in his mouse shape, swimming ashore with a whale which he had caught. The people of the village were alarmed, but the woman said she knew the animal since she was a conjurer.

When the mouse came to land out walked the man, and confronted his mother-in-law. In this way her false pretensions were exposed, and she was so overwhelmed with shame that she died.

The figure at the base of the pole represents the mouse; the second and fourth figures are the whales caught by the young man in the mouse's skin.

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[1] *Tsimshian Texts*, p. 50. Txämsem seems to be identified with the raven.

[2] *Coast Indians*, etc., p. 323.

[3] For legend of NEngKilstlas, see Boaz, *Indianische Sagen von der Nord-Pacifischen Küste Amerikas*, p. 306.

With that part of the legend which deals with the capture of the mouse, it is interesting to compare the story of the poor little boy, Masemstiō̃ntsē'etsk^{u}, related by Boaz. (*Tsimshian Texts*, p. 146 foll.) Here the hero is chased by a huge frog which comes out of the lake, and which he ultimately catches in a trap made of a tree split and wedged in the same fashion as that mentioned above. He then puts on the frog's skin, and catches fish in the lake, and later fish and whales in the sea. A similar trap is also mentioned in the story of Ts'ak (*ib.* p. 133).

Of these two legends, the first seems the more detailed and perfect; and though the introduction of the mouse in the second somewhat adds to the story, it seems very hard to believe that the artist intended the second and fourth figures to represent the same animal, since they are so very unlike both in form and in colouring.

Also in both poles the arrangement seems to suggest that the young man is shown inside the fourth figure. The idea of a man assuming animal shape in the water is found in the legend of the killer whale related by Niblack,[1] and is illustrated in the house post now in the Pitt Rivers Museum at Oxford.[2]

With regard to the figure at the base. In the case of the larger pole it is said to be a sea-bear. In the case of the model it is said to be a mouse. The model house, however, is called the bear-house (Haida, *Hūj-nas*), and the owner's crest is the grizzly bear. On each of the corner posts sits an animal with grinning teeth, said to represent the latter; and inside is a small totem post representing the same animal, but with no teeth showing between his lips, sitting on the head of another creature said to be the frog. The bear inside the house resembles, to some extent, the animal at the base of the pole outside, and is coloured in the same way; his snout, however, is rather shorter and his mouth more of a straight line. It would be possible to suppose that the small head between the feet of the outside figure is that of the frog, certainly it is a miniature of the second animal inside.

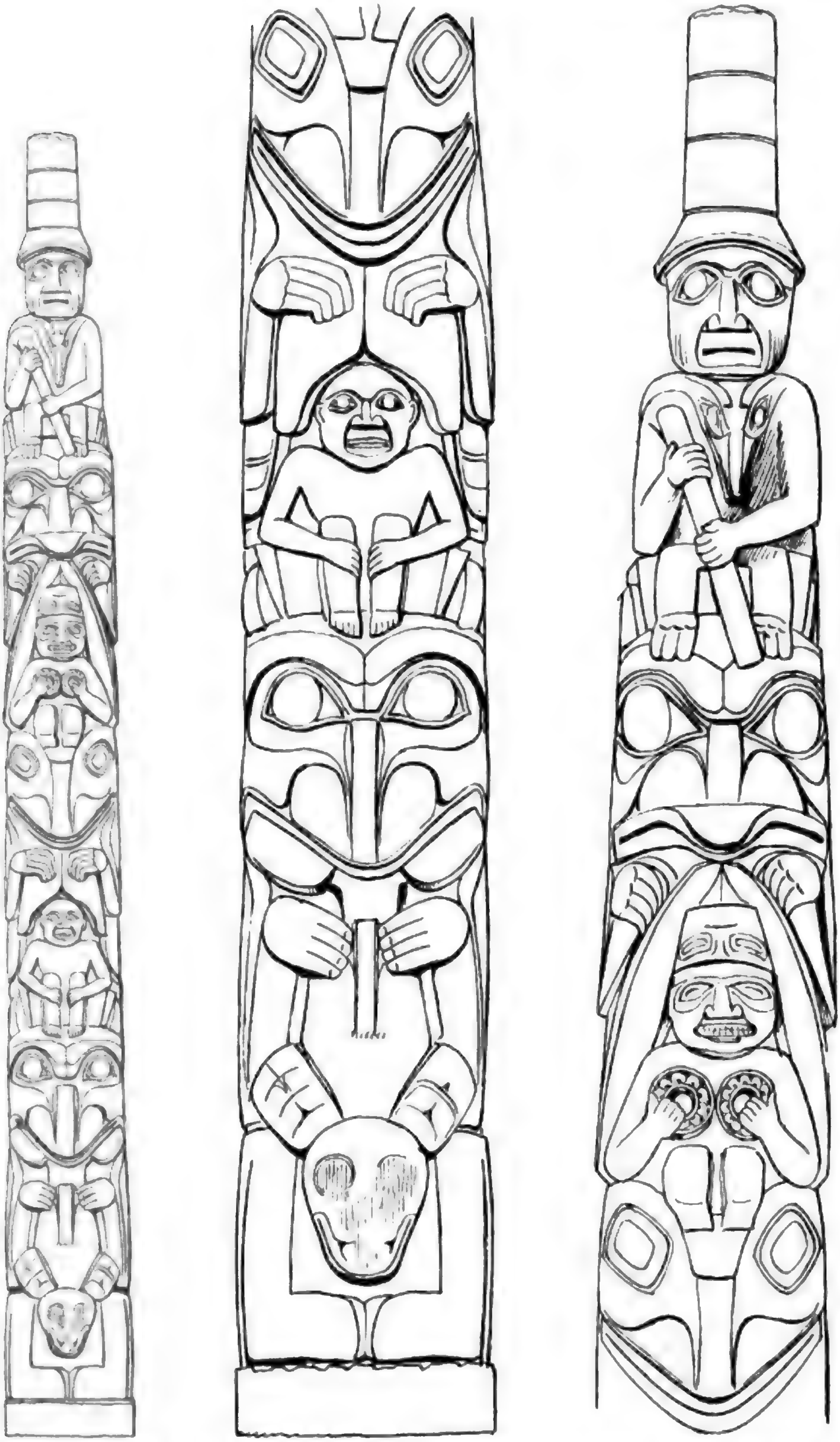
On the other hand the animal at the base might conceivably be identified as a mouse, in the case of both the large pole and of the model, this would explain the whale he is represented as holding in the former. Then the small head in the latter would also be that of a whale, the body of which has disappeared owing to the necessity of constructing a door in the pole. We then might suppose that the legend originally represented the young man as assuming, for the purpose of confronting his mother-in-law, the form of one of the whales he had caught in his mouse-shape, and this would explain the fourth figure.

The difficulty of the question is only increased by a reference to the totem pole at Fox Warren. In this case the animal at the base appears from the photograph recently published in this Journal[3] to resemble exactly the figure on the Kayang pole, even to the tail of the whale, which he holds in his mouth.

[1] *Coast Indians*, etc., p. 322.

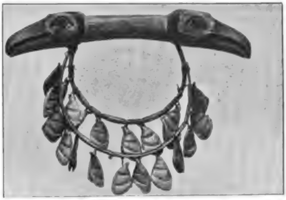
[2] *Journ. Anthrop. Inst.*, xxviii, "On the Totem-post from the Haida village of Masset, Queen Charlotte Islands," p. 133. Prof. E. B. Tylor.

[3] *loc. cit.*

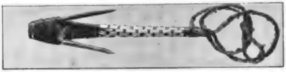


Totem Pole, village of Kayan, near Masset, Queen Charlotte Island. (Height 39 feet.)

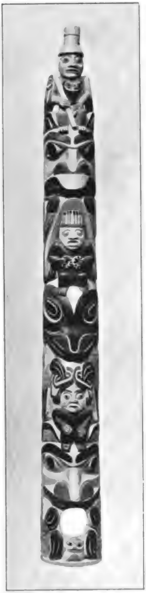
A TOTEM POLE IN THE BRITISH MUSEUM.



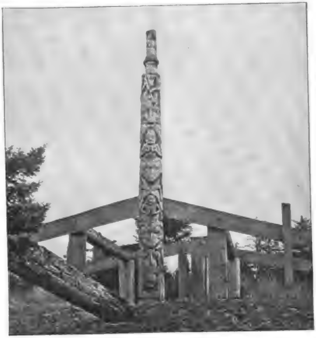
2. Rattle of Puffin Beaks, N.W. Coast of America; Christy Collection. (Breadth 24 cm.)



3. Hook with two points, N.W. Coast of America; Vancouver Collection. (Length 16·5 cm.)



1. Totem Pole of a Model House, now in the British Museum.



4. The Totem Pole, with remains of house, on the shore at Kayan.

A TOTEM POLE IN THE BRITISH MUSEUM.

And this animal is said to be the Wolf! Personally, I am inclined to the first theory, that the bear or sea-bear is the animal represented, chiefly because that animal is, in both cases, the totem of the owner of the pole. The fourth figure would then be the whale, and the two elongated marks appearing under each elbow would be fins. The story of the raven seems quite sufficient to account for the peculiar flat face of the second figure, and also gives additional point to the figure at the top.

The decline, in the native estimation, of the importance of these totemic columns has doubtless led to a similar decline of the interest felt in the stories which they embodied. The original forms have undergone further alteration by improvisations on the part of the story-teller, and by confusion with other legends. This naturally renders the identification of the more obscure types of animal in the totemic carvings and paintings a matter of considerable difficulty, and it is to be hoped that, as opportunity arises, as many legends as possible relating to totem poles and similar carvings will be placed on record for purposes of comparison with the stock already published.

THE LOLOS AND OTHER TRIBES OF WESTERN CHINA.

[WITH PLATES XXI, XXII.][1]

BY A. HENRY, M.A., F.L.S.

As is well known, numerous aboriginal tribes are met with in the west of China, in that vast mountainous region which is the easterly continuation of the Himalayan mass. The physical character of the country, which consists of countless mountains separated by deep valleys, is favourable to the preservation of isolated communities of men. In this region also, we have the meeting point of races coming from all sides—the Tibetans from the west, the Chinese from the east, and the Shans from the south; all these being superimposed upon truly aboriginal types, which, however, often exist tolerably pure, and include small people, who may be classed as pigmies, and who, perhaps, will be found to be of the same stock as the pigmies of Europe, whose skeletons have lately been dug up in Switzerland and Silesia.

The number of tribes is very great; but they can be reduced to a few stocks, about which a few words will not be out of place.

Tibetans.—These occur on the western borders of Szechwan and Yunnan, in various tribes. One of these is the *Kutsung*, who live in the north-west of Yunnan, near A-tun-tze. Men of this tribe come to Szemao, a frontier Customs post in the south of Yunnan, where I was stationed. They arrive in charge of mule caravans, which convey tea from Szemao to Lhasa. They differ from all the races to the eastward, Chinese and Indo-Chinese, in having hearty bluff manners and a ringing laugh, united with a simple disposition. They express admiration by a peculiar clucking noise. They are fine men, and I measured two who were 6 feet 2 inches in height.

Miao-tze.—The home of this stock is in the province of Kweichow; but they have been migrating for several generations, and are now to be met with here and there as farmers in the mountains in Yunnan, and in French territory, south of the Red River. They are always farmers cultivating poor mountain lands. Their women wear short kilts, and jackets, which vary in colour and cut, according to the tribe. Hempen garments are generally worn, which are made out of hemp fibre, grown, spun, and woven by themselves. All the Miao-tze speak practically the same language and have the same customs and physical features. Their language is tonal and monosyllabic, but the vocabulary shows no affinity with that of the other languages of the same group.

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[1] The figures of Plates XXI and XXII are reproduced from photographs by Mr. F. W. Carey.

Yao.—These are distributed in isolated villages over an east and west line, extending from Szemao in Yunnan through the south part of that province into Kwangsi; some are met with in French Laos. It is probable that they are the aborigines of Kwangsi, and in appearance the men recall somewhat the Cantonese type of Chinese. Their women have a peculiarly babyish face. The men wear wide trousers and jackets, fastened in the middle line by numerous buttons. They are expert hunters; and they have the monopoly of two peculiar cultures, which are carried on in forest clearings, and, possibly on this account, their villages are always perched in the high mountains on the verge of the great forests. One of the plants which they grow is a species of *Aralia*, which yields a rhizome used as a drug by the Chinese under the name *San-ch'i*. They also cultivate a species of *Strobilanthes*, from which they extract indigo. They also manufacture paper out of the bamboos, which occur at high elevations. Their language is distinct from that of the other tribes, but it is also tonal and monosyllabic.

Shans.—The Shans are essentially dwellers of the low-lying plains and valleys of Upper Burma and Southern Yunnan, and are only a variety of the Siamese; indeed, Shan and Siam are different spellings of the same word. The Shans are impervious to the pernicious malarial fever, so prevalent in the river valleys of this region and so deadly to all other races. They differ essentially in physical characters and in morals from the Chinese and other races. It has been supposed that the Shans have descended from China; but I am inclined to think that their migration has been from the coast up the great rivers, such as the Mekong and the Salwen; and they may have a Malay admixture. Besides the Shans proper or Tai, there are other tribes speaking dialects of Shan, and resembling the Shans in features, who are to be met with far north in China proper. These are the Chung-Chia of Kweichow, the T'o of Kwangsi, the aborigines of the island of Hainan, and the Tu-lao, Lung-jen, Sha, etc., of Yunnan. It is remarkable how little diversity of dialect has sprung up in the Siamese language, spoken by all these tribes, scattered over an immense area; this is an argument in favour of their late dispersal. Shan kingdoms have existed in Yunnan and Kwangsi; indeed, the ancient kingdoms of Yunnan are reported to be Shan. Still, I am not convinced but that some of these in early times were Lolo. Yunnan became Chinese territory in 1252. The Shan women are noted for their pretty dress, and their free and easy manners; their outlook on morality differs entirely from that of the Lolos or Chinese.

Woni.—The Woni are a dark swarthy people, who are the aborigines of the territory south of the Red River in Yunnan and French Laos. They are divided into numerous tribes, such as the Woni proper, the Mahê, Pudu, Kado, Aka, Piza; they seem to be the people known to the French as the Kas. Their language, in vocabulary, resembles that of the Lolos; but the two peoples are markedly different in colour, features, etc. The Woni include people who are scarcely Mongolian, as the oblique eye is wanting, and remarkably handsome people, of good physique, occur amongst them. The women are often so uniform in feature that I found it impossible to distinguish one person from another. Some of these tribes blacken, others redden the teeth.

Before dealing with the Lolos, who are one of the main stocks, the Pula, who speak a dialect of the Lolo language, may perhaps be thought worthy of mention. The Pula are met with near Mongtse and Yuanchiang, and are of diminutive stature. I found one village, isolated in the mountains, north of Mengtse, where the women scarcely exceeded 4½ feet, the men 4¾ feet high, all well-formed people. The inhabitants, who rushed from the fields to see me, were very gay, laughing boisterously, and behaving in an unguarded hilarious way. Their dress is in crude colours of green, blue and red. They worship a tree near the village; and are fond of dancing, music and alcohol. When the Pula come into the Chinese towns, they become silent, reserved and timid. Filing homewards along the mountains in large parties, dressed in gaily coloured garments, these little people are a pretty sight. The Chinese, who are the conquering race in Yunnan, look upon the Pula and Lolos with some dread, as they credit them with powers of witchcraft. It struck me that in Yunnan one can now observe a similar state of things to what may have existed in Britain and Ireland when a primitive pigmy population, driven into the mountain wilds and woods by their conquerors, and displaying similar characteristics of elusiveness and uncanniness, may have given rise to the fairy legends, and I now find that Dr. Rhys has advanced the theory that our folk-lore presupposes a prehistoric pigmy population, about which we now know something from the pigmy skeletons that have been dug up in Switzerland. The pigmies of Yunnan are probably a pure race, and their speaking a Lolo dialect is due perhaps to the fact that the Lolos, a conquering race, coming from the north, have impressed their language on the Pulas, and various other peoples in Yunnan, such as the Muji, Aja, Sansu, A-ch'o, K'u-ts'ung, all tribes of inferior physique, who are now to be found scattered amongst the mountainous regions of South Yunnan.

Lolos.—The Lolos are now found in all parts of Yunnan, and in a few districts in Kweichow; but the home of the race is in Szechwan, between the Chien-ch'ang valley and the great southerly reach of the Yangtze, in the great Taliang Mountains, where they retain their independence in a country as large as Wales. No one has entered this country, which I shall refer to as *Lolodom*, but Baber and other travellers have skirted its borders, and given us some account of these pure Lolos. They are, according to Baber, a tall people, taller than any Europeans, with no small people amongst them. Their faces are oval, with large level eyes, somewhat prominent cheek-bones, an arched but rather broad nose, and a pointed chin. The face has a curious tendency to wrinkles, especially on the forehead. The hair of the men is gathered into a knot and enclosed in a cloth, so as to form a horn some nine inches long. The men wear a long mantle of felt. The women wear the hair in two plaits, and wear jackets, and flounced and pleated long petticoats. The vocabulary of the Lolos of Taliang is substantially the same as that of the Lolos of Szemao and Mengtse, the Lolo people whom I have studied.

My Lolos were evidently not quite pure, as their stature was often only moderate, and they have acquired certain habits and beliefs foreign to the pure Lolos. Still the material which I have collected, consisting of manuscripts, a dictionary, grammar, etc., of the Lolo language, is of great value.

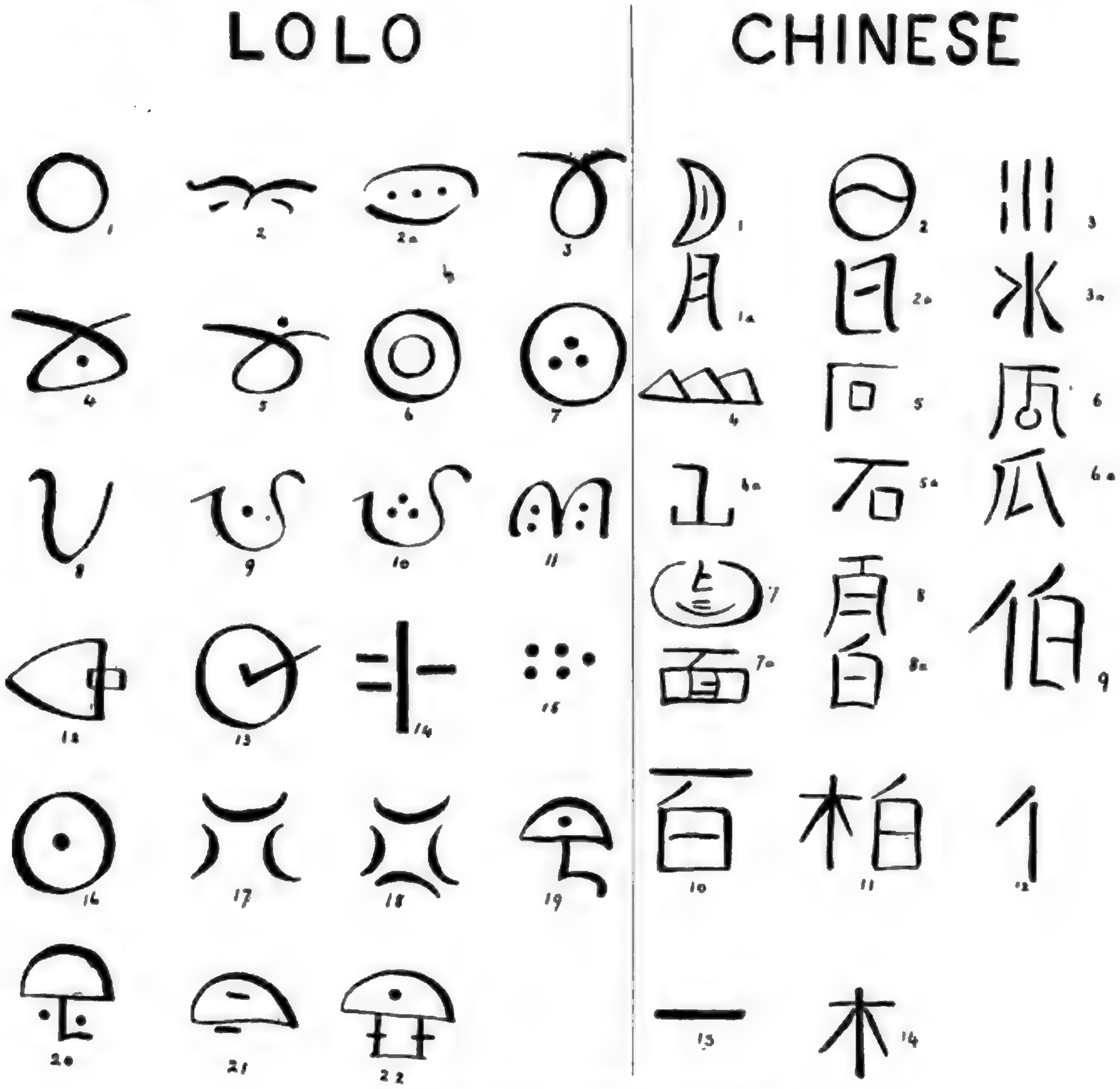
The most remarkable fact about the Lolos is their possession of a script or mode of writing which is unique. It is pictographic in origin, but not borrowed from Chinese. They have many manuscripts from which we can accurately learn their religious rituals and beliefs. The importance of a written record of a primitive people is unquestionable, as we are, as a rule, too dependent on oral testimony for our knowledge of primitive folk. These manuscripts are always written, and have been copied and recopied, and so handed down from generation to generation. The subject matter is religious rituals, books of genealogy, legends and songs. The origin of the writing is obscure, but it is referred to in the Chinese history of the Yuan dynasty, which flourished in the thirteenth century. The writing, as in the case of Chinese, is in vertical columns, but, unlike Chinese, these are read from left to right successively. This is an interesting point, as it corresponds with the mode of writing in later Syriac manuscripts, and certain beliefs and stories of the Lolos seem to me to point to the influence of early Nestorian missionaries, who had stations in Yunnan at the time of the visit of Marco Polo, and probably many centuries earlier.

Chinese characters always represent a definite word and are thus ideographic. A large number of them are compound, one part of the character representing the sound, and the other suggesting the meaning. Lolo characters were originally pictographic, but they now represent sounds, and are simply syllabic. They are never compounds. It cannot then be supposed that Lolo writing is derived from Chinese. In Fig. 1 a few Lolo and Chinese characters are shown, which illustrate the different origin and nature of the Lolo and Chinese scripts.

LOLO.

1.	*ng'o*	the moon.	12.	*lo*	the ear.
2. 2a.	*ji*	the sun.	13.	*za*	to hit.
			14.	*ka*	middle.
3.	*i*	water.	15.	*k'e*	above.
4.	*zih*	to leak.	16.	*t'o*	a pipe, a tube, a bucket.
5.	*beh*	a mountain.	17.	*pe*	to wrap.
6.	*heh*	a lake.	18.	*tä*	to carry in the arms.
7.	*lu*	a stone.	19.	*'ng*	the head.
8.	*pu*	a hole.	20.	*duh*	to think.
9.	*p'eh*	a gourd.	21.	*nä*	the eye, black.
10.	*k'aï*	a bowl.	22.	*nguh*	to weep.
11.	*sla*	the face.			

It will be seen that most of these are simple pictures; some are derivatives, *e.g.*, 4 and 5 are derived from 3 by the addition of a dot. *Za* (13) is an arrow or javelin hitting a target. 15 probably is originally a picture of *stars,* and has come to mean *above.* 20 is a derivative of 19. 22 is a picture of tears, dropping from the eye.


LOLO
CHINESE
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2a
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17
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1a
2a
3a
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5
6
4a
5a
6a
7
8
7a
8a
9
10
11
12
13
14

FIG. 1.—LOLO AND CHINESE CHARACTERS.

CHINESE.

The first eight characters are given in pairs, one representing the original pictographic, the other the modified form now in use. It will be seen that their origin is distinct from that of the Lolo characters.

1, 1*a*. the moon.
2, 2*a*. the sun.
3, 3*a*. water.
4, 4*a*. a mountain.
5, 5*a*. a stone.
6, 6*a*. a gourd.
7, 7*a*. the face.
8, 8*a*. white.

The phonetic character of the great bulk of the Chinese characters is illustrated in 9, 10, 11. These are the characters for *uncle, a hundred,* and *cypress tree.* These words have the same sound as *white,* namely, *peh.* They are compounded of the character for *white*; and on the side of, or above this, are put so-called radicals, which give a clue to the meaning.

12. a man.
13. one.
14. tree.

Accordingly:—

9 is *peh,* uncle, *i.e.,* the man, whose sound is *white.*
10 is *peh,* hundred, the numeral with the sound *white.*
11 is *peh,* cypress tree, the tree, the sound of which is *white.*

The Lolo language is of extreme simplicity, both as regards its phonology and syntax, and its manner of making new words. It belongs to the *monosyllabic* class of languages, of which Chinese is the most highly developed member. Attempts have been made to deny the primitive monosyllabic nature of the Chinese language, and to consider it as broken down from some pre-existent polysyllabic agglutinative tongue. I am of opinion that a comparative study of Chinese, Lolo, Miaotze, etc., will establish that this tonal monosyllabic class is primitive, and that we have in the vocabularies of these languages original roots unchanged.

To illustrate the simplicity of Lolo phonology, I may state that all words are monosyllables, composed of either a vowel or of a consonant followed by a vowel, as *A, O, BA, BO, BI, BU.* Such combinations as *AB, ARD, STO, STAR,* are impossible. The initial consonants may all be considered simple, though such varieties occur as *T* and aspirated *T,* and four sibilants, as *S, Z, TS,* and *DZ.* There is one apparent exception, namely, *SL,* in *SLA, SLO, SLU*; but I found that this occurred in another district as *THL,* showing a certain instability of sound; and further research established that the original sound, still kept in Lolodom, is an aspirated *L,* so that we have *L'O, L'A, L'U.* Similar aspirations occur in connection with *T, P, CH, K,* and *NG.*

Tones in Lolo are three or four, according to locality. There are no inflections whatsoever, the simple roots being unchangeable. All the words are simple roots, but by simple addition they can be used to express new ideas, thus *gunpowder* is now called *fire-rice.* I could only find one modification of the simple roots, occurring in four causative verbs, and they are these:—

DZO, to eat.	*CHO,* to give to eat, to feed.
DA, to drink.	*TA,* to give to drink.
DU, go out.	*TU,* to cause to go out.
DEH, to wear.	*TEH,* to give to wear.

The syntax is very simple, the place of words in the sentence being the most important factor. Post-positions, personal and demonstrative pronouns, interrogative words, adverbs of time, and a few auxiliary verbs occur; but relatives and conjunctions are absent. Numeral co-efficients are present, as in all the Chinese group of languages, and in Malay. We cannot say *two men*, *ten trees*, but must say *man two person*, *tree ten stem*. The plural, tenses of verbs, etc., are rarely expressed, unless absolutely needed; and a Lolo sentence is very suggestive of baby-talk. Thus, "If he comes, I shall not see him" is expressed as "He come I he not see give"; and "When he came, I did not see him" as "He come that time I not see."

I consider that the simple phonology and primitive syntax of the Lolo language are important to study, as we there see a primitive monosyllabic tongue, composed of simple roots, the type by which all languages must have begun.

I will now pass to the beliefs of the Lolos. Their religious observances are mainly an attempt to propitiate the evil spirits and ghosts, who bring disease and other disasters to men. The Lolos consider that man has a soul. When a live person is seen in a dream, it is his soul that comes; when a dead man is seen in a dream, it is equally his soul that is visible, and next morning there must be prayer and sacrifices to appease the wandering soul of the deceased. When death occurs, the soul leaves the body with the last breath, and it is considered of vital importance that this event should be witnessed by some person, otherwise the death is impure, and the ghost of the deceased (*i.e.*, the released soul) will cause trouble and sickness to his relatives. All cases of death by accident, childbirth, suicide, etc., are impure; and the ghosts of these are malignant, and must be propitiated by sacrifice and rituals. I met one day in the forest a Lolo priest hunting deer. Two days after he died; surprised at the suddenness of the occurrence, I inquired the cause of death, and elicited the following story. A man of middle age, he had married three times; his first two wives had died in childbirth. Sacrifice and rituals were duly made, but it was hard to counteract a double event so malignant: the ghosts of the two dead wives harassed him continually. On the night of the day I met him in the forest, they came. He sickened, refused medicine, ordered his silver to be dug up and given to his son; and he then died, for he was forced to go away with the two unclean ghosts. Another priest, my informant, was sure of the facts, as he had tested the matter by divination.

The soul is supposed to leave the body in cases of chronic illness. A complicated ritual is then read, a kind of litany, in which the soul is called by name and besought to return from the mountains, the valleys, the rivers, the forests, the fields, or from anywhere that it is wandering. While this litany is being read, cups of water, wine and rice are placed at the door of the house for the refreshment of the returning soul. After the ceremony is over, a red cord is tied round the arm of the sick man, to retain the soul, and this cord is worn till it drops of itself from decay.

The growing crops, the cattle of the farm, are also endowed with a soul. When the rice is poor in growth, the soul of the crops is entreated by another litany to return. Certain articles are carried into the field on a sieve, which are variously symbolic. They consist of a woman's new dress, a necklet, a broom, a hoe, a hen, a pine branch, three joss-sticks, and a cup of rice on which is placed an egg.

The ceremonies and rituals in case of death and burial are numerous and complicated. After death a hole is made with a pole in the roof of the house to enable the breath or soul to escape. A cow is brought to the door of the house, and from its head is extended a white cord, which is fastened to the hand of the corpse lying inside in the coffin, and a ritual called *Su-pu* is read. If the death is unclean, a preliminary purificatory ritual is necessary, after which the usual rituals can be recited. On the second and third day after death, two important rituals, the *meh-cha* and *wu-cha*, are read. When the coffin is being carried out for burial, a paper effigy is placed on it, which represents clothes for the soul of the dead man. At this time also, the priest recites the "*Jo-mo*" or Road Ritual, and he accompanies the coffin a hundred paces from the house. This ritual begins by stating that as in life the father teaches the son, and the husband the wife, it is only the priest who can teach the dead man the road that his soul must travel after death. The threshold of the house is first mentioned, then the various places on the road to the grave, and beyond that, all the towns and rivers and mountains that must be traversed by the soul till it reaches the Taliang mountain, the home of the Lolo race. Here the priest says that he himself must return, and entreats the dead man to pursue his way beyond the grave alone. The dead man then enters Hades, and stands beside the Thought Tree and the Tree of Talk, and there he thinks of the dear ones left behind and weeps bitterly. After this ritual is read, the priest returns to the house, and the coffin goes on to the grave.

The Lolos believe that for each person on earth there is a corresponding star in the sky. So, when a man is ill, a sacrifice is often made of wine in cups to his star, and four-and-twenty lamps are lighted outside his room. On the day after a funeral, a hole is dug in the death-chamber at a spot indicated by rolling an egg on the ground till it stops. A ritual is recited praying the star of the dead man to descend and be buried in this hole. If this were not done, the star would fall and possibly hurt someone.

The ancestral tablet is made on the second day after the funeral, and erected in the central room of the house on the ninth day, with an appropriate ritual. It is worshipped on certain dates, and on all important occasions in life. It is called *I-Pu*, *i.e.*, ancestor. It consists of a structure of wooden pieces, made out of the *Pieris* tree, the log of which was the ark of the Lolo deluge. A transverse bundle of grass is made of the same grass as is used for thatch. Two pieces of bamboo root represent the deceased father and mother, one having nine, the other seven joints. The inscription reads, "The dwelling-place of so-and-so (giving the name), the pair, man and woman, our ancestors." It is written by the priest with ink, the water of which is brought by the son of the house from a secret spring in the forest, from a locality only known to the family of the deceased man.

The ancestral tablet was probably originally a fetish, and the ancestral worship is grafted on it perhaps from Chinese sources.

There are three classes of evil things, which affect the Lolos with disease and calamity. 1st, the ghosts of those who have died unclean deaths; 2nd, demons; 3rd, *Slo-ta.*

Demons are numerous, and of different colours, green, red and blue, some with dishevelled hair, others with hair standing on end. They are like men in appearance, but invisible. They shoot the arrows of disease; one causes bad dreams.

Slo-ta are unusual appearances, unnatural phenomena, and as such, not only portend, but also cause disaster. The *Slo-ta* are, *e.g.*, hens that crow like a cock, monstrous births, cooking vessels that make a booming noise on the fire, dogs or cows getting on the roof of a house, etc.

These three kinds of evil things are exorcised by reading rituals and offering sacrifice. The Lolos believe that the ghosts or demons come for the food and wine that is offered; and their theory of sacrifice is that it is blackmail. If not offered, the demons, etc., will act malignantly. The exorcisms are long; the demons are alternately coaxed and threatened. The priest waves a thorn-branch as a whip against the evil things.

The priest is also the teacher of the village school, and is a farmer like the other people. He is not consecrated, but simply has learnt his trade, namely, to read the proper rituals, to kill the sacrificial animals, and to conduct the ceremonies properly. He is rewarded with a fee.

With regard to good spirits and their worship, the Lolos have no temples, though in certain cases they have imitated the Chinese in putting up a shrine with rude idols of the earth spirit, etc. The Lolos properly speaking have only one idol (Fig. 2), which is a stone about a foot high, placed at the base of the Dragon Tree, the tree of worship which is in every village in Yunnan in a wood behind or close to the houses. The real meaning of this stone worship is lost, and no ritual is used when sacrifice is made at it, twice a year, of a fowl and a pig. It is now explained to be a god in the sky who protects the people; and unlike certain other spirits that are worshipped by particular families, it is the subject of universal worship.

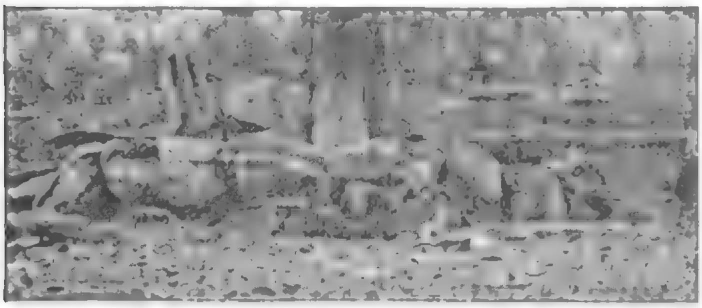


FIG. 2.—LOLO WORSHIP-STONE.

The Dragon Tree is seen at all villages in Yunnan, whether Chinese, Lolo, Pula, etc. It is supposed to be the seat of a dragon which protects the village, and sacrifice is made at it of a pig, the scapula of which is afterwards tied to the trunk of the tree. The tree is no particular species; it may be any large tree.

The Lolos believe in patriarchs, who live in the sky, and each surname worships a different patriarch. The chief of these is Tse-gu-dzih, to whom many attributes of a deity are given. It is he who opened the box containing the seeds of death, and so gave the boon of death to the world. It was he also who caused the Deluge.

The Lolos have a cosmogony. Their account of the Creation is that there were two spirits, A-chi and A-li. A-chi made the sky and made it evenly and well. A-li slept, and on awakening saw that the sky was completed. In his hurry to do his work, he dumped hurriedly earth here and there. This accounts for the inequalities of the earth's surface. When the sky was first created, the sun and moon were dull, and did not shine properly. They were washed by two sky maidens, and have remained clean and bright ever since.

The legend of the Deluge runs that people were wicked, and Tse-gu-dzih to try them sent a messenger to earth, asking for some blood and flesh from a mortal. All refused but Du-mu. Tse-gu-dzih then locked the rain-gates and the waters mounted to the sky. Du-mu was saved with his four sons in a log hollowed out of the Pieris tree; and there were also saved otters, wild ducks, and lampreys. From his four sons are descended civilized people who can write as the Chinese and Lolos. The ignorant races descend from men that were made by Du-mu out of pieces of wood. Du-mu is worshipped as the ancestor of the Lolos, and nearly all legends begin with some reference (like our "once upon a time") to Du-mu or the Deluge. Du-mu and precedent men had their eyes placed vertically in their sockets, after him came the present race of men, who have their eyes placed horizontally. This quaint idea may have some reference to the encroachment of the oblique-eyed Mongolians, who have horizontal eyes as it were, *i.e.*, eyes narrow in height, whereas Europeans and other races have eyes that may be called vertical, *i.e.*, wide from above downwards.

The Lolos, Pula, etc., generally keep a Sabbath every sixth day; and ploughing is not done on this day. Its strictness varies; in some places the Lolo women are not allowed to sew or wash clothes even on the Sabbath.

The legends concerning the patriarchs, who, I omitted to say, are stated by some legends to have once lived on earth, to great ages of 660 and 990 years, the Deluge, the Sabbath, all coupled with the Syriac order of writing, induce me to believe that the early Nestorian missionaries had some influence on the Lolos. We know from Marco Polo that Nestorian churches existed in Yunnan in the thirteenth century, and the Nestorian Alopen arrived in China in A.D. 635.

The great authority on the religions of China, De Groot, says that he has found no trace in China of animals being worshipped in the capacity of tribal progenitors, and he entertains serious doubts whether any so-called totemism exists in Eastern Asia as a religious phenomenon. It is interesting then to know that Lolo surnames always signify the name of a tree or animal or both tree and animal, and that these are considered as the ancestors of the family bearing the name. This name is often archaic. Thus the surname Bu-luh-beh is explained as follows:—Bu-luh is said to be an ancient name for the citron, which is now known as *sa-lu*.

The common way of asking a person what his surname is, is to inquire "What is it you don't touch?" and a person of the surname just mentioned would reply, "We do not touch the *sa-lu* or citron." People cannot eat or touch in any way the plant or animal, or both, which enters into their surname. The plant or animal is not, however, worshipped in any way.

People of the same surname may marry if there is no obvious relationship. There are, however, groups of two or three surnames, amongst whom intermarriage is forbidden, and no explanation of this is given. There are also groups of two or three surnames who are called comrades, and intermarriage amongst them is favoured. Marriage is brought about by the father of the boy selecting a wife for his son She is brought home by the groom and a friend, and is accompanied by her brothers and a number of attendant girl friends. The feast occurs in the father-in-law's house. The remarkable peculiarity amongst the Lolos is that invariably, some days after marriage, the bride escapes and runs home to her father's house. The husband sends presents to her father to induce her to return, but often she will not go back without much persuasion; and in the event of several requests for her return being unheeded, the husband is permitted to go for her, and beat her until she yields.

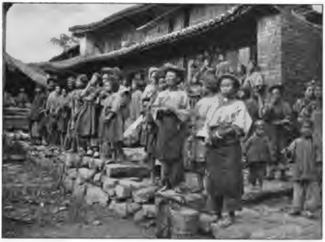
The Lolos are fond of music, singing and dancing. Dancing takes place at feasts and for amusement and has no religious signification.

Witches, the evil eye, lucky and unlucky days, etc., are all believed in; and there is a long ritual the reading of which will cause the death of a witch; in it the demons are prayed to flay her skin, eat her flesh, exhaust her breath, etc.

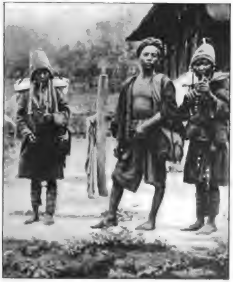
There are, of course, many branches of Lolo folk-lore that I have been unable to touch upon in this paper; but I think it will be interesting to give a literal translation of a Lolo song, which is sung in the fields by the girls, addressing the boys.

We girls three,
The black earth's silver bridge,
Together with you youths, we have crossed it;
The white sky's golden hat,
With you we have worn it;
The golden fan of the sun and moon,
Together we have seen it wave.
We girls and boys to-night have met.
Singing and playing comes from the hearts of boys and girls;
Silver comes from China;
Silk from the capital;
The rice from the plain;
The wheat from the mountain;
But courting-talk comes from the mouths of boys.

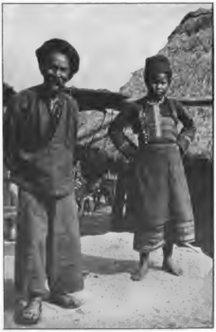
The primitive character of the poetry is shown by the simplicity of the epithets, "white sky," "black earth," and the simple statement of facts of every-day life, may be noted.



LOLOS OF SOUTH-WEST YUNNAN.



WONI (AKK'A) MAN AND WOMEN.



SHANS (TAI HUA) OF SOUTH-WEST YUNNAN.

THE LOLOS OF WESTERN CHINA.

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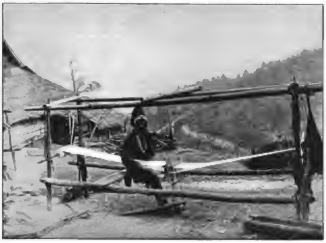
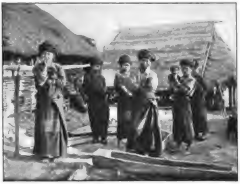
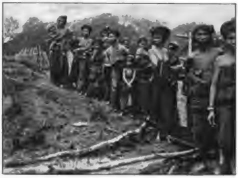


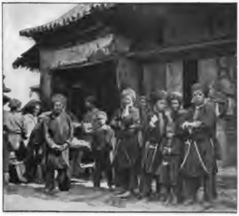
AKK'A WOMAN AT THE LOOM.



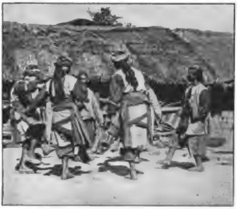
SHANS (TAI NE) OF SOUTH-WEST YUNNAN.



SHANS (TAI LU') OF SOUTH-WEST YUNNAN.



YAO WOMEN OF SOUTH-WEST YUNNAN.



LOLOS DANCING.

THE LOLOS OF WESTERN CHINA.

Another poem is the lament of the young married woman in her husband's home, the house of the stranger. Lolo wives are not unhappy, but they are lonely at first.

They ask the go-between, who lives at the head of the village;
They speak of the price of the girl;
Her mother names her price;
Her father covets another man's silver.
The girl is sixteen years of age,
Her marriage time is come.

The girl has gone to the marriage house,
She has no comrade as she stands;
The central bamboo of the house is her standing comrade.
The girl has no friend to sit with;
The cooking stove is her sitting friend.
She has no comrade to walk with;
The broom is her walking comrade.

If the husband's father and mother are not good,
When she goes to the well,
They will say
The water she brings home is dirty.
The dry firewood she gathers in the forest;
They will say it is wet,
And throw it down on the ground,
And utter a sentence:
"Stupid people, whatever they do, give trouble."
The hare, no matter where it crosses the river,
Finds the water deep.
No matter what the girl does,
Not a single thing is good.

The Lolos have many pretty stories, and the preceding will give some idea of their literature. The written language varies considerably from the spoken tongue in arrangement of words, and is nearly always arranged in lines of five words each. This is interesting, as showing that primitive literature takes invariably a poetic or rhythmical form.

I have left untouched their interesting midsummer holiday ceremonies, which are considered by them to be the festival that equals in importance the Chinese New Year. Their village rules are also of great interest. These, and much other interesting matter, I hope later to publish in book form.

NOTES ON THE BUGILAI, BRITISH NEW GUINEA.[1]

By the late Rev. James Chalmers.

When, having sailed about sixteen miles from Dauan, we entered a small creek and landed there, I was told the people had to be looked for, as they have no really fixed abode, being sometimes far away back in the bush, and, at others, nearer to the coast. Where we were was all deep mud, and I was informed that it was not so bad as just inside of the mangroves where "plenty water, plenty mud he stop." So I decided to remain in the boat, and await the return of those who were going in quest of the natives. We had a long wait, but eventually four men appeared on the bank, one of them with innumerable curls about a foot long, and all of them with skin-disease. One was the chief, and so getting him on board of the boat, I rigged him out as a chief ought to be. Soon we were all friends, and they begged for a teacher, and asked me to stay the night. "No, I cannot stay, but will return soon. You (the chief) had better come and see Dauan," where none of them had ever been before. The furthest excursion by sea ever made by any of them was one to Boigu, made by the chief and a few others many years ago.

Hullo! here they come, men all armed, women carrying baskets of food and children, and other children, led by the hand. The men, who went in for them, had been busy teaching them how to shake hands, but only a few had learned the lesson so as to do it at all. They had bows and arrows, hair head-dresses, and baskets for sale, but wanted cloth for them; eventually, they took tobacco. Would not we wait until the morning? No, we understand it too well. It meant getting everything we had, and then we should leave ruined, every bit of trade gone, and only a few things in return. For the first visit, trade a little, cause no excitement, and get away after a very short stay.

We got them all crouching on the mud, or on branches of mangrove, and had a short service in which they were told that the Great Spirit, God, loved them, and us, and all, and I hoped they would soon know more about Him. Up gets the chief, "Tamate, give us a missionary, we are hungry for one" (they are not cannibals and never have been). "If you give us a missionary we shall all leave this bad country, and go to Mai Kasa, and there live." I asked him who the *all* were, and he said, "The Bugilai, the Tebatalai, and the Wasi, and these live all in this country, Beralag, Gaimalag, Uibalag." He also gave me a redivision again, the Tabatala, Bera, Buzi, Drapa, Mat, Wasi, Wiba. I hope to be able to give them a teacher, and soon.

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[1] Mr. Chalmers (Tamate) was the first white man to visit these people, so the accompanying account of his visit is of especial importance. This paper was received some time ago, but was held back, as it was hoped that Mr. Chalmers would be able to enlarge it. Alas! this is now impossible, and so it is printed as it stands. The Bugilai country is about long. 142° 30′ E.—[Ed.]

They live in small humpies. Saplings are stuck into the ground, bent over, and the other end also stuck into the ground. The bark is stripped from the tree, and placed on as thatch; a small opening is left, and in there all crawl on cold or wet nights, and there also all their valuables are kept. They travel about a good deal, but I should suppose not so much as the Australians, as they make plantations which will keep them nearly a year at one place.

They call all the country opposite to Dauan, Dipa, and I think that will apply to all the country known by them in New Guinea.

There is one Great Spirit that they call Kaka, but where he lives, and what he does, the chief could not tell me, saying, "I am a young man" (about thirty) "and you must get some of the old men to tell you." When the sun sets, he goes down under the earth, and then travels along a great tunnel, which takes him all night, and then comes up in the morning.

They have plenty of sorcerers, men and women, and there are ghosts everywhere. I think it would be a good place for "Will-o'-the-wisps," as there is plenty of swamp for gases. At the initiation of young men, they practise sodomy, but not bestiality as some other tribes do.

They wear charms round the neck, and others they keep in baskets in their houses. When any one dies, the spirit (*Yedo*) goes right away to Bĕmor in the west, where there is continual feasting and dancing. They have many gods.[1] One family will make the crocodile its god, and they will on no account eat any part of it. When they can secure a small one alive, it is carried to where they are living, and presents of food and things are laid down beside it. It is the same with the kangaroo. The family whose god it is, will not touch it; and so with other animals and birds.

All their food is cooked in native ovens, or on the fire, just laid on. They have no cooking utensils whatever, and so are like the natives on Kiwai (p. 117), and all around the mouth of the Fly River. In some places, they cook in shells. They have a good variety of food, such as yams, banana, sugar-cane, sweet potato, taro, and others, also coconuts, but not in abundance.

The men were passable. I saw two very short ones, and a few really fine specimens. The women were not up to much, and all the children had skin-disease. Some of them were very bright looking. The men had no covering, but I was told they wore the pubic shell at times. The women wore petticoats, the same as those about the Fly River, only the outer one hung down to the ankles, whereas on the Fly River, they tuck them in between their legs, and fasten them to the girdle, back and front.

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[1] By "gods" Mr. Chalmers evidently means totems.—[Ed.]

All dreams are real occurrences. When one sleeps, the spirit goes off on its travels, and returns just when awakening.

The people were delighted with the visit, and on leaving, called after us to be sure and return soon. The chief would not risk the boat, saying, "I never saw a boat before, but I have a canoe" (they have none), "and I will go in the canoe."

The chief is now on Dauan, and I have been able to make a very fair vocabulary. I fancy these are the New Guinea aboriginals, and the progenitors of the Boigu, Dauan, Mabuiag, Badu, Moa, Prince of Wales islanders, and, it may be, the northern tribes of Queensland. They are the nearest New Guinea tribes that I have yet met, similar to those in the Straits and North Australia.[1] As we become acquainted with them, we shall be better able to discuss the question as to whence they are, and whither gone. True they have got the short tufty hair, and not the long hair, of the Australian. They live better, having gardens with all kinds of good food, and that may account for many differences. Judging from the few Australians I have seen, I do not consider these natives much superior to them in physique. Like the Australian they live much by the chase, *dakaliran*, especially during the south-east monsoon.

Their language[2] has no resemblance to any Polynesian one I know, but is similar to that of Boigu, Dauan, and Saibai.

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[1] We leave this as it stands in Mr. Chalmers' MS. The northern tribes of Queensland are the Australians.—[Ed.]

[2] Mr. Chalmers' short Bugilai Vocabulary has already been printed with notes by Mr. Sidney H. Ray, cf. *Journ. Anthrop. Inst.*, xxvii, 1897, p. 139.—[Ed.]

A VOCABULARY OF THE BUGI LANGUAGE, BRITISH NEW GUINEA.

By the late Rev. James Chalmers.

(Communicated with a Supplementary Note by Sidney H. Ray.)

Numerals.

One ...	*tarangesa* (little finger of left hand).
Two ...	*metakina* (ring finger of left hand).
Three ...	*gingi-metakina* (middle finger of left hand).
Four ...	*topea* (index of left hand).
Five ...	*manda* (thumb).
Six ...	*gaben* (wrist).
Seven ...	*trank-gimbe* (elbow).
Eight ...	*poder* or *podei* (shoulder).
Nine ...	*ngama* (neck or left breast).
Ten ...	*dala* (ear or right breast).

(The words in brackets indicate the part of the body touched when counting.)

Pronouns.

(Personal.)

I, *nyana*.
Thou, *bea*.
He or she, *bo*.

We (including person addressed), *yibi*.
We (excluding person addressed), *ba*.
You, *bibi*.
They, *bo*.

(Possessive.)

My, *mbo*.
Thy, *bena*.
His, *wobo*.

Ours (inclusive), *ba*.
Ours (exclusive), *wobena*.
Yours, *benae*.
Theirs, *obadago*.

Phrases.

What is this?	*iakagamalo*.
Come to-morrow	*bai edebaga*.
Bring me a coconut	*gali eme nu*.
Where is the chief?	*benanga denda*.

SKY, AIR, WEATHER.

Sky, heavens	*tuka.*	Day	*yabada.*	Night	*qete.*
Sun	*yabada.*	Light	*ruripoqanaqandra.*	Year	*wat.*
Moon	*kak.*	Heat	*wamba.*	North	*kabaga-maibau.*
Star	*qatai.*	Forenoon	*yabad-tukama.*	South	*sjai-maibau.*
Cloud	*yedoqel.*	Noon, midday	*yabada-tukame.*	South-east	*wera.*
Wind	*wurlem.*	Afternoon	*oponēn.*	East	*wir-maibau.*
Gale	*erasedeuralem.*	Twilight	*laga dana podagan.*	West	*kabaga-maibau.*
Rain	*yngula.*	Evening	*yedebaiyedebea.*	Earthquake	*mangue.*
Fog	*yeduqid.*			Place of departed spirits in the west.	*bemor.*
Calm	*matago.*				

LAND AND WATER.

World	*palyama.*	Smoke	*tenei.*	Flood tide	*bemadibu.*
Inland	*aitramaioa.*	Water	*ngi.*	Ebb tide	*qatata.*
Island	*kauala.*	Fresh water	*ugi.*	Foam	*baua.*
Mountain	*pad.*	River	*tauwa-bobo.*	Beach	*dedigea.*
Stone	*dader.*	Flood	*boba.*	Coast	*damada.*
Dirt	*qata.*	Bog	*bereber.*	Cape	*trelie.*
Lime	*yudei.*	Ditch	*boba.*	Lagoon	*trangopota.*
Hole	*gapogapoa.*	Salt water	*kapiang.*	Coral reef	*majza.*
Cave	*po-mae.*	Sea	*enepanagang.*	Passage in reef	*dana-gap.*
Fire	*iu.*	Salt	*droqal.*		

PERSONS.

Name	*beam.*	Brother (man's elder).	*bona-gaboigu.*	Enemy	*labeaimuadra.*
God (Great Spirit whose abode and actions are unknown).	*Kaka.*	Sister (woman's)	*erang.*	Guest	*naqa.*
Man	*la.*	Son	*galde.*	Missionary (speaking man)	*la-zjabliakaban.*
Woman	*mala.*	Daughter	*bo-galda.*	Whitemen	*teatra.*
Baby	*galde-kadrot.*	Husband	*monde.*	Ghost (man's spirit).	*yelo*
Child	*mapeta.*	Wife	*gitram.*	Demon	*gegal-naqska.*
Girl	*gitakar*	Uncle	*bagwatra.*	Albino	*palamang.*
Twins	*kamama kombale.*	Son-in-law	*manang.*	Idiot	*nangkapa-ngama-aganamandra.*
		Chief	*benang.*	Liar	*kekaaweada.*
		Friend	*naqa.*	Generation	*agudershao.*

PARTS OF THE BODY.

Body	*potra.*	Navel	*kam-bea.*	Instep	*maipadag.*
Bone	*qetr.*	Stomach	*kam.*	Head	*beneqet.*
Flesh	*seseruwende.*	Loins	*tarabo.*	Forehead	*ieta.*
Blood	*teia.*	Buttocks	*goembe.*	Skull	*benqit.*
Fat	*ngi.*	Liver	*zebe.*	Brain	*qider.*
Skin	*waland.*	Kidney	*dragopo.*	Face	*yet.*
Artery	*betoalundra.*	Joint	*gabeu.*	Eye ball	*kalye.*
Soul	*angika.*	Shoulder blade	*podai-kut.*	Eye brow	*yenapletu.*
Neck	*qata.*	Shoulder	*podai.*	Eye lid	*yendebetroia.*
Throat	*naugapa.*	Arm	*tranga-patra.*	Tears	*ngandatei.*
Collarbone	*podera.*	Elbow	*tran-qimbe.*	Ear	*laandra.*
Chest	*drala.*	Hand	*trang-qab.*	Nose	*wede.*
Rib	*tutam.*	Finger	*trang-lepelta.*	Mouth	*boda.*
Breast or bosom.	*ngama.*	Hip	*tote.*	Lips	*boda.*
Milk	*tape.*	Thigh	*wende.*	Teeth	*lenge.*
Lungs	*katram.*	Knee	*katra.*	Tongue	*dangcmai.*
Breath	*amtat.*	Leg	*ngianga.*	Saliva	*koka.*
Heart	*te-kapa.*	Calf of leg	*mana-kapoa.*	Lower jaw	*tabe.*
Belly	*kam.*	Foot	*maka.*	Chin	*tabe.*
Bowels	*kamo.*	Ankle	*ugan-kut.*	Hair	*benqa-lala.*
				Beard	*tralqam.*

ANIMALS.

Pig	*simbel.*	Pigeon (white)	*treb.*	Fly	*alako.*
Snout	*gambatope-wede.*	Duck	*adra.*	Grasshopper	*koka.*
Dog	*daranga.*	Fish	*qalba.*	Mosquito	*eangana.*
Rat	*makata.*	Shark	*baidam.*	Ant	*nana.*
Kangaroo	*trale.*	Crocodile	*kadsa.*	Spider	*qandiqandi.*
Bird	*pa.'*	Iguana	*tame.*	Centipede	*kamo.*
Egg	*pa-kapa.*	Snake	*diben.*	Crab	*gilyena.*
Feather	*pa-qam.*	Turtle	*waro.*	Crayfish	*sok.*
Wing	*dramba.*	Frog	*palugo.*	Conch	*mipi.*
Tail	*sera.*	Insect	*sore.*	Oyster	*dara.*
Fowl	*kaiek.*	Butterfly	*papelug.*	Pearl shell	*kak.*
Hornbill	*dangam.*	Flea	*tetek.*	Coral	*dadar.*
Owl	*gologolo.*	Louse	*kabana.*		

PLANTS.

Forest	*walanga.*	Fruit	*minng.*	Bamtoo	*dangu.*
Tree	*lu.*	Seed	*paopo.*	Sugar-cane	*wala.*
Wood	*lu.*	Gum	*yedegania.*	Ginger	*lengedeba.*
Bark of tree	*troia.*	Banana	*agi.*	Tobacco	*sakupa.*
Bough	*pi.*	Coconut	*nge.*	Taro	*bie.*
Branch	*tarko.*	Mango	*wiwi.*	Yam	*gilebea.*
Leaf	*lu-pi.*	Sago	*bitsi.*	Grass	*siera.*
Flower	*popo.*				

HOUSE AND CANOE.

Village	*maidu.*	Wooden bowl	*qater.*	Sail	*kabie.*
Path	*nyango.*	Flag	*ngoiqe.*	Rope	*pimisire.*
Gate	*wede.*	Mat	*kaibia.*	Cord, twine	*lalata.*
Fence	*qalkakat.*	Cage	*mai.*	String	*kab.*
House	*māē.*	Ship	*dandagmailu.*	Pole for canoe	*ture.*
Door	*wede.*	Canoe	*lu.*	Leak	*gapogap.*
Basket	*ienga.*	Raft	*qerdeba.*	Load	*wataiñwaga.*
Sack	*nogulaba.*	Mast	*kaba.*	Grave	*kupennokalan.*

IMPLEMENTS AND WEAPONS.

Adze	*pambu.*	Net (fishing)	*qel.*	Spear	*tota.*
Axe	*pambu.*	Paddle	*karaba.*	Shield	*wola.*
Stone axe	*turika-ble.*	Drum	*alepeu.*	Club (stone)	*bidabida.*
Tomahawk	*turika.*	Bow	*bagal.*	Sling	*dranqil.*
Knife	*yita.*	Arrow	*tobal.*	Gun	*bagalya.*
Fish-hook	*trudi.*				

DRESS.

Belt	*galgal.*	Beads	*pepate-kapo.*	Mirror	*angikanika.*
Petticoat	*pite.*	Lime bottle	*bana.*	Fan	*mava.*
Girdle	*galgal.*	Comb	*terei.*	Cloth	*yedegabia.*
Necklace	*amoto.*				

LIFE, DEATH, DISEASE.

Birth	*azegan.*	Diarrhœa	*qimbi-tratla.*	Ringworm (scaly).	*kambikambi.*
Life	*traama.*	Dysentery	*tiea.*	Ditto (not scaly).	*palata.*
Death	*qadala.*	Elephantiasis (of leg).	*demba.*	Toothache	*lenge-tratla.*
Murder	*morti-boanana.*	Fever	*togan-yĕ.*	Ulcer	*pie.*
Hunger	*kamaeauda.*	Headache	*ben-dadaga.*	Wound	*tatabo.*
Famine	*mbomai.*	Ophthalmia	*ngini penazan.*	Medicine	*kamakame.*
Disease	*togan.*	Rheumatism	*ngengegakakapa.*	Poison	*madaie.*
Ache	*ngantogingan.*				
Cough	*qimbiea.*				

MISCELLANEOUS NOUNS.

Anger	*meliqama mamagana.*	Half	*dambata.*	Rumor	*mundunder.*
Breadth	*tarpaterpam.*	Meeting	*akulemala.*	Shame	*badbad.*
Contract	*mana.*	Message	*trona.*	Smell	*berira.*
Deceit	*kekaoenda.*	Noise	*beseroeakalna.*	Song	*napadaba.*
Dream	*ander.*	Payment	*mu.*	Speech	*yagoniqina.*
Falsehood	*kekauendika.*	Peace	*gabela.*	Summit	*tuk.*
Farewell	*nabendoau.*	Piece	*tatapa.*	Treaty	*mana.*
Feast	*tokopi.*	Present, gift	*maniemdegan.*	War	*mak.*
Fun	*ngatenegumalenga.*	Remnant	*raisdiemdigan.*	Witchcraft	*iendrapagidagid*

ADJECTIVES.

All	*belam.*	Difficult	*dagatra.*	Little	*baibo-katra.*
Ashamed	*badebad.*	Distant	*yendom.*	Long	*gumbatope.*
Bad	*gugalmeange.*	Dumb	*iaka-manda.*	Many	*laiene.*
Beautiful	*audi.*	Edible	*patra.*	Much	*laiene.*
Big	*raisida.*	Feeble	*mundramad.*	Old	*qede.*
Blind	*inupsai.*	Good	*audi.*	Right side	*tratra.*
Bright	*audi-palmang.*	Great	*raisida.*	Ripe	*agiwawa.*
Cold	*kalkala.*	Hot	*wamba.*	Sick	*togan.*
Corpulent	*gunubo-potrang.*	Ill	*tratala.*	Tall	*gambatope.*
Curly	*beniq-am.*	Lazy	*uganam-dagatra.*	True	*narqanda.*
Dark	*qobi.*	Left side	*trat.*	Warm	*wamba.*
Dead	*qadala.*	Liberal	*maniemadegan.*	Weighty	*manqag.*
Deaf	*dandermanda.*				

COLOURS.

Black	*betebet.*	Red	*gulgulteyu.*	White	*palamang.*
Green or blue	*sagasagada.*	Yellow	*sagodag.*		

Verbs.

Bite	*lenga-dadaga.*	Flog	*peara.*	Rob	*gamala.*
Boil	*qima.*	Forget	*aundagan.*	Row a boat	*galae.*
Bring	*delimenin.*	Give	*namandaga.*	See	*iendepaineyana.*
Burn	*wenatramana.*	Guide	*yangue-milanga.*	Shave	*tratraqam troqe.*
Bury	*aññagala.*	Hang	*noqalangug.*	Sit	*ademin.*
Buy	*yedrugenain.*	Haste	*mangalanda.*	Sleep	*yindu.*
Call	*noteimandan.*	Hear	*andarla.*	Smile	*leng-liglegla.*
Carry on shoulder	*trolenada.*	Hunt (kangaroo).	*dakaliran.*	Sneeze	*azie.*
Chew	*uwetalaim.*	Hunt (men)	*martanadunan.*	Snore	*garangaram.*
Come	*baiao.*	Kick	*ugang gandaia buanana.*	Sow	*nibenyan.*
Cover	*yindaqindea.*	Kill	*mak.*	Spew	*manda.*
Crawl	*yergoda.*	Kiss	*bode-tremetreme.*	Spit	*koka-sepal.*
Crouch	*wola.*	Kneel	*pepetrokopa.*	Stay	*ngan-aziplan.*
Dance	*yangalu.*	Laugh	*tongwe.*	Steal	*gamae.*
Die	*qadala.*	Lick	*dangama-rametral.*	Strike	*naboan.*
Dig	*qalqal.*	Lie down	*matoataran.*	Swallow	*nangyenyin.*
Dine	*tukumae.*	Loiter	*mobiendan-na-benda.*	Swim	*tatua-aziplan.*
Do	*nganyinudega.*	Make	*uganangasen.*	Tatu	*qaime binye.*
Drink	*ngi-nana.*	Plant	*koko.*	Think	*ngangapo-wanga wanga.*
Drown	*nesigana.*	Rejoice	*nunqamulugan.*	Translate	*nepine ēna.*
Eat	*wata.*	Reply	*amailyaman.*	Tremble	*bilbilyema.*
Expectorate	*kaka.*	Return	*nosanakubudelen.*	Walk	*nabo.*
Fasten	*palpal.*			Warn	*tronai yemeyelo.*
Fear	*damae.*			Weep	*ngandalan.*
Fight	*gagada.*				

Adverbs, etc.

Here	*geenda.*	To-day	*gaunda.*	Who	*aitrala.*
There	*dadad.*	To-morrow	*yedobag.*	What	*eandadega painda.*
Upward	*tuk.*	Yesterday	*tetem.*	And	*a.*
Downward	*palyana.*	No	*yao.*		
That	*dadad.*	Yes	*ao.*		

Supplementary Note.

The vocabulary here printed was given to me by the Rev. James Chalmers during my stay with him at Saguane in the Fly River, in September, 1898. A printed list in English (arranged alphabetically) and Motu, issued by the New Guinea Government, has the Bugi written opposite. I have arranged the matter in a more convenient form and also divided compounds when recognized. A very short vocabulary of the same language was printed in the *Journal of the Anthropological Institute* in August, 1897 (vol. xxvii, p. 139). The tribe (Bugi-lai, *i.e.*, Bugi folk) is now merely the remnant of a much larger one, which was formerly much persecuted by the Tugeri. It is now settled permanently under British protection at Bugi village at the mouth of the Mai Kasa River.

This vocabulary is an important addition to our knowledge of the languages in British New Guinea, between the Fly River and the British-Dutch boundary. At present only ten languages are known. These are:—

1. Tagota ... Lower Fly River.
2. Kiwai ... Islands in Fly Delta.
3. Kunini ... Coast between Oriomo and Binaturi Rivers.
4. Jibu ... Inland at head of Binaturi River.
5. Mowata ... Coast opposite Torres Straits.
6. Dabu ... West side of Paho River.
7. Toga ... East side of Paho River.
8. Bugi ... Mai Kasa River.
9. Dungerwab... Wasi Kasi River.
10. Bangu ... Morehead River.

Some words in the Bugi resemble those of the neighbouring languages. There are also some agreements with the languages of Torres Straits, especially with that of the Murray Islands.

The alphabet used is that of the Motu, British New Guinea. Vowels are sounded as in Italian, consonants as in English. The sound of *q* is that of *qu* in *quite*, *ng* as in *sing*, *sj* or *js* is a palatal *s*.

NOTES ON THE NATIVES OF KIWAI ISLAND, FLY RIVER, BRITISH NEW GUINEA.

By the late Rev. James Chalmers.

The island of Kiwai, at the mouth of the Fly Estuary, is between 30 and 40 miles in length and 1½ to 4½ miles in breadth. It has several villages, the largest of which is Iasa, formerly known as Kiwai. The whole population of the island is not more than four thousand, and may be considerably less. Of the natives, the males are tall and muscular, the women not good looking, and not large.

As a people they are not hunters, but occasionally go out with their dogs and bow and arrows, and hunt for the wild pigs that frequent the bush.

The dogs are used chiefly to hunt the wild pig. Only in a few places are the dogs eaten, in the majority of places they are looked upon as unclean.

They have canoes (*pe*), with one outrigger. These canoes are chiefly got from Dibiri, on the mainland, near the mouth of the estuary, and on its eastern side. A few of the smaller ones are made by themselves.

The large canoes obtained from Dibiri, are traded to Parama, Tureture, Kadawa and Mawata; and they trade them to Saibai, Dauan, Boigu, Mabuiag, Badu, Moa, Prince of Wales, Waraber, Damut, Masig, Stephens Island, Darnley and Murray. In all of these places, the single gives place to a double outrigger, with a platform in the centre, and a large amount of ornamentation fore and aft; these canoes are used for dugong fishing, and for going long journeys.

On Kiwai they use canoes for going to plantations and taking home food. Sometimes they paddle standing, but more frequently sitting. When they are anxious to get on quickly, their paddling is all done standing. Frequently women may be seen poling the canoe along, and the man, or men, squatting, one of them steering.

A tree called *aibi* grows on Kiwai and on the mainland, from which they make the paddles, hence their name, *aibi*, for paddle.

They have for fishing a trap with bait inside, into which the fish go, and are prevented from getting out again by the thorns on the trap, which is made from the spine of the sago palm leaf. The trap, *conea*, is held in the hand by a long cane, and is then allowed to float down the river.

The *parane* is a trap fixed at the mouth of a creek which has been barricaded with saplings, and the *parane* is placed in the small opening left when the tide turns to ebb. The fish that may have gone into the creek with the flowing tide, and are now returning with the ebb, swim into the trap.

The *karako* is a spear used for fishing, and the bow and arrow is also so used.

Meat is always roasted on a fire, never boiled; sago is put into leaves and placed on a fire; pig is roasted, as are yams, taro, etc. Thinking I should be doing a great good, I brought over twenty Motuan cooking pots; some I gave to the teachers, and they cooked vegetables in them, and the others I wished to exchange for curios, but they would not have them. Rather than keep them to be broken, I gave orders they should simply be given away, but even then the natives would not take them. When a Kiwai crew is at Dauan, they prefer their food roasted, and get tired of boiled rice in a few days.

The women do most of the cooking, but at certain seasons they do not touch the food, and the husband himself will do it then. Before touching food the hands are well washed, as is also the food before placing it on the fire. Men, women and children eat together.

Fire is obtained by rubbing, as in the South Seas and in the eastern parts of New Guinea; sometimes by a length of cane drawn swiftly across a piece of wood held down by the foot: the ends of cane are held in both hands as among the Koiari at the back of Port Moresby.

On Saibai, Dauan and other islands of Torres Straits, fire is produced by a pointed stick rolled in the hand and on a soft stick, as in Australia.

There is no one in particular in charge of fire. Fire was first produced on the mainland near to Dibiri by two men, whose names I could not get. All animals tried to steal some of the fire and swim across to Kiwai with it, but failed. Then all the birds tried it, and they too failed, when up flew the black cockatoo, and he said he would get it. He dropped down and got a good burning stick and then flew away with it, letting it fall on the various islands on his way across the estuary, but always picking it up again. When he came to Iasa, his mouth was terribly burned, hence the red spot on both sides of his beak. At Iasa he let it drop, and the people secured it, and have fire ever since.

The houses are built on posts, and are from 4 to 6 feet off the ground. A village is often comprised of one house several hundreds of feet in length. The longest I have measured was 692 feet. In some places they will have several large houses, at others, one large one and several small ones, in which the female part of the population sleep. I have also seen women in the large houses.

These *darimo* (large houses) are divided into stalls say 12 feet long and 8 feet broad, and run down each side, leaving, in the centre, a fine broad path where feasting and dancing take place. If a house has two chiefs, each will occupy an end. The houses are thatched with nipa palm leaves, and the flooring is a palm. The doors are at each end, and are simply apertures sufficiently large for a single man to step over the threshold. Overhead, as well as on the threshold, is a carved charm; these charms up the river are called *abaea*, and on Kiwai *gope-gope*.

The only furniture is the wooden pillow; and hung round the stalls may be seen drums, bows and arrows, and fish traps.

They are all agriculturists, and make good gardens, fencing them because of the wild pigs. Men and women do the work unitedly. The island is very low and swampy, and the people have to drain well for plantations. These drains are well cut, and are in many places 2 feet deep. The ordinary depth is about 12 inches, but I have seen them as deep as 2 feet 9 inches.

Everywhere they cultivate the soil and plant taro, yams, sweet potatoes, bananas, and have growing coconuts, bread-fruit, mango and many other fruit-bearing trees. They use for planting a long, hard palm stick, shaped at one end like a paddle, which does well for making the drains and turning over the soil. The women use these to fight with when there is a row in the village.

They have small wooden human effigies varying from 10 inches to 3 feet long. The small ones are used as charms, and the larger ones at the initiation of youths, or when they are going to fight, or when there is sickness in a family.

When the *Burumamaramu* (or bull roarer) is used, all the women and children and all uninitiated young men leave the village, that they may not hear it, and so escape the curse attending it to all uninitiated ones. The young men are introduced to it just before the beginning of the yam season. When the weird sound is heard, sago is prepared and pigs are killed, and the youths giving the feast are shown the piece of bamboo attached to a string. They cannot, of course, produce the sounds from it at first, but after some practice they become experts.

The effigies *Kurumi, Uruparu* and *Paromiti* are made of wood, and used at the time of initiation (*Moguru*). To see them, large feasts are prepared and the season is made a very festive one. The lads are coloured with red and white, in the same way as the effigies, and have long pendants of fine wisps, made from the young frond of the sago palm, hanging from their ears. When the lads are shown these effigies, fire is showered over them by the old men, and they are warned against revealing anything said or done under terrible penalties of being murdered, poisoned, or seized with a fearful disease of which they can never get rid. The more secret and immoral practices I cannot here repeat.

Charms are made by the older men, and sold to the younger for food, etc. There are house charms, canoe charms, and plantation charms.

They do not cast lots, and have no poison ordeal; but to get rid of any one, poison is given clandestinely in food.

They are not cannibals, and never have been.

The dead are buried in nearly all the villages of the islands in the estuary of the Fly River. The spirit of the dead remains in the ground near to the body, and occasionally comes up and looks around, but returns again to the ground. No one dies from sickness, but having been poisoned by someone, the spirit is watched so as to get information that the family or tribe may be punished.

A few years ago, a party of Sumai natives went to Domori and were treated kindly by the natives, but shortly after their return home, one of the leaders of the party fell ill and died, and the spirit appeared and reported that a certain Domori man was the cause of death. The human effigies were consulted, and the chief Kerosa did all that was necessary and reported they must attack. They did so, and several Domori natives were killed. Kerosa and another chief were afterwards apprehended by the Government, tried and convicted, and sentenced to death. The sentence was afterwards commuted to ten years' penal servitude.

Nothing is buried with the dead. When the body of a man is buried, his bow and arrows are stuck at the head of the grave. When a woman is buried her petticoat is hung upon a stick. A small platform is made over the grave, or sticks are stuck along the sides, and on these are placed sago, yams, bananas, coconuts, cooked crabs and fish: all for the spirit to eat. A fire is also lighted by the side of the grave, and friends keep it alive so that the spirit may not be cold at nights.

On the ninth day after burial, a feast is prepared, the drum is beaten, and the conch shell blown, and then the chief mourner pronounces the fire-lighting and placing of food at an end.

Nowhere in New Guinea have I found spinning or weaving. They dye the petticoats and pieces of native cloth (which is made from the bark of a tree and worn at dances) with mud, turmeric, mangrove bark, *ame*, *sosogoro*, and other plants.

In making petticoats, some of the fibre from the young frond of the sago palm is steeped in a muddy hole and left there for a few days; when taken out and washed, it is quite a brown colour. To produce the yellow dye turmeric is scraped and mixed with water, and in that some of the fibre is steeped. The other dyes are procured in the same way. Having no pots of any kind in which to boil fibre and bark, or seeds, they are not able to secure the same distinct and fast colours as those employed east of Orokolo.

They like music, and have the drum (*gama*), which is used on great festive occasions. Many of them play the harp (*begube*), and nearly all know the pan pipes (*biago*). When pigs are to be killed, or a war party is to set out, or on returning from a successful raid, the conch shell (*tuturo*) is blown. What nonsense has often been written about the war horn sounding in the bush, or at night in some coast village! Few foreigners know the fighting note, and only a few more have ever heard it.

It can only be for noise that the *korare* (a bunch of dried nuts without kernels) is held in the hand when dancing, and the same for the *kerere* (a piece of bamboo 4 feet long with a split piece), which is struck on the floor and makes a strange cracked sound as the dancer moves along.

The *wasaraposo*, flute or whistle, is also played; with the mouth, and not with the nose, as in the South Seas.

They are all smokers, and "from the beginning" tobacco has been grown and smoked. When the leaf is ripe, it is dried, and then plaited into lengths; and when they go trading, is carried as a girdle round the waist. It is said that they grow a very good tobacco. The foreign tobacco is not in so much request as in the eastern parts of British New Guinea.

Their way of smoking also differs from that of the eastern tribes. The *waduru* is the length of bamboo, with a small opening at one end and a hole at the side near the other or blind end. The *aturupo* is the tubular bowl that is placed in the hole, it has an open mouth in which the tobacco is placed. To smoke the tobacco, a light is held to it, and the smoke is sucked with the mouth into the bamboo from its open end, and when well alight the *aturpo* is taken out and the lighted end placed in the mouth and blown hard. When the smoke is passing through freely, it is again inserted in the bamboo, which is filled and passed on to be inhaled from the hole into which the *aturupo* was placed. Everyone smokes, old and young, men and women.

They use the *gumada* (*Piper methysticum*). When a feast is to take place the young men chew the root and collect their saliva into wooden bowls and water is added. On the day of the feast only those who have passed through all the stages of initiation may drink it. Large quantities of it are drunk. The root of the Fly River kava is much smaller than that of the South Seas.

The areca nut and betel pepper, with lime chewing, are known nowhere in the estuary below Domori; but at Domori it begins, and seems to be used much further up the river.

They have many plants they use for external application, but no internal medicines. I have got a list of these, but have not yet been able to identify the plants or trees.

When wishing to bleed—and they do that for nearly every ache—they use a shell, *sauaria*, which they chip before operating. Now they prefer glass, when they can get suitable bottles.

They shave by twisting two lengths of coir together, which take hold of the hair, and then it is pulled out. It is a long operation, but not a hair is left, and the subject of the operation looks as if no hair had ever grown. They also shave with a piece of bamboo, which is very sharp when strips are taken off.

They have no knowledge of gold or precious stones. Nearly everywhere at the mouth of the estuary, lengths of angle-iron are seen, and are of very great value, being converted into gouges and adzes for digging out canoes. No one remembers when stone was used. Generations ago they had iron.

There is no tattooing, but all the women are cicatrised on chest, arms and legs. Cicatrising is begun when they are very young, and carried on at different times, until they are married. Incisions are made with a shell, and to these coconut oil is applied, so that, when healed, the scar is quite distinct. The various tribes differ a little in their designs.

Children of both sexes have the nose and ears pierced. Any child not being pierced would be a scandal, and could not, under any circumstance, marry when grown up. When the time for piercing has come, a large feast is prepared by the parents, and the mother's father or uncle does the piercing with the sago palm thorn.

If it is at all possible to get shells, they wear them on their ears as ear-rings, and as frontlets and necklaces. The girls, on gala days, wear very large wooden ear-rings, and also flowers and feathers. They paint the face red and white, and the young men wear long *amesosogoro*, fringes made from young fronds of sago palm and dyed a reddish colour. These are fastened into holes all round the lobe of the ear.

At the initiation of the young men to *Moguru*, the *amesosogoro* is worn very long, and, when the feasting is over, it is cut close to the ear, and these they wear until they drop out.

They have a nose ornament, a piece of wood, ¾ inch diameter, and pieces of shell stuck on at each end. They have also shell nose ornaments. I fancy the women, as a rule, wear larger ones than the men, and it makes them look hideous.

They shave the hair off in many peculiar ways: some with a tuft in front, and one on each side, just above the ears; others with a ridge left on top of the head and running down to the back of the head; whilst others have small squares all over the head, or lines running in every direction. The shaving is done with a shell, but now they use glass whenever they can get it.

Until marriage, a girl wears her hair long, which is spoken of as "maiden hair." When married, that is shaven off, and kept; and when next the hair grows it is called "woman's hair," and not thought much of; it is never allowed to grow long. From April to the yam-digging season, men, women and children lime the hair, until it becomes a golden colour. During that season they assemble at Iasa: at least, those belonging to that tribe.

The males have no covering for the person, and only when dancing or fighting is the pubic shell worn, and even then, it may be worn at the side. Sometimes the women wear it, but outside of the petticoat.

The men have no clothing, and the women wear only a petticoat with a very long fringe, which is passed between their legs and tucked under its belt in front and behind. A new one is put on after each *menses*, the old ones being thrown away. Married and unmarried women wear the same kind of petticoat, which is made from the young frond of the sago palm.

The shield is never carried by any tribe of Fly River natives I know. When going to fight they put on an arm-protector, to prevent the bow-string, on the rebound, from cutting the arm. They also put round the head strips of coconut leaf, also round the neck, over the chest, and round the legs, just under the knee.

They use the bow and arrow, and a few have clubs which come from the west, but the spear is not employed. They do not use a javelin in fighting. Frequently a small piece of bone is fastened to the arrow-head, so that it enters the body, but when the arrow is drawn, the bone is left, and unless it is cut out, death will follow. Women always follow to the fight, and they kill outright with their sticks any who may be severely wounded. The women also do the looting. The men say they are a great encouragement to them, as they urge them on; and they also create a feeling that they must be protected. The women themselves like it.

Mos est quum in pugnam proficiscantur, duces in vicinis Moguru silvis cum uxoribus ante concubare: et si penis erectio firma obtigerit, tanquam felici omine certam in victoriam prodire: si tamen aliter evenerit, non prodire. Mane ergo cum in vicum regressi essent, qualis fuerit eventus interrogati, si felix fuit, "felix," respondent, "prodeamus": si autem infelix, paucis verbis iter differunt.

When heads are brought home, the muscle behind the ear is given in sago to lads to eat that they may be strong.

They have no marks of distinction as at the east, where bravery has tattoo marks. The skull[1] is secured, and the more skulls, the greater the honour. No young man could marry, as no woman would have him, without skulls. Often a family would leave, and go far away for a length of time, and then return with skulls—perhaps all of them were bought—so that it might be said they had skulls. Sometimes a young man would go to friends at a distance, say Mawata, or Tureture, and would remain there for many months, and on his return home would have several skulls, which he bought from or through his friends, but on reaching his village, he would put on a solemn and sacred air, and, although in confidence to his relatives only, it was soon known by all in the tribe he was a great brave, and the lady he loved would soon be his.

Canoes have often been given in exchange for a skull. When an enemy is killed, the head is cut off with a bamboo knife, and the *garaoro*, head-suspender, is inserted through the mouth, and on it, the head is carried home, amidst great rejoicing. A fire is made, and the head is placed over it, until all the hair is singed off. Whilst this is being done, all the young girls of the village assemble, and dance in a ring round it, with singing (*nekede*). All the flesh is taken from the head, and then it is well cleaned, and, after feasting, it is hung up on the main post of the house, the most valuable of trophies.

They have no money, and use for exchange canoes, sago, bows and arrows, tobacco, etc.

The large and best canoes are dug out at the villages near the mouth of the river on the left bank. Once I called there, and all along the bank, in front of the village, were quite a hundred large canoes, covered with coconut leaves. My boat's crew were natives of Ipisia and Saguane, and, as soon as those ashore saw them, the coconut leaves were thrown aside and the canoes exposed for sale. Several of my crew arranged to have canoes, selected by them, sent to their homes, or kept for them until they returned.

I have tried to find out if they had any knowledge of the stars and constellations, but could meet with no one who knew anything at all about them.

I have not found any ancient stone implements among them[2]; and if former generations had them, they are now without them entirely.

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[1] *I.e.*, the skull of a slain foe.—Ed.

[2] Stone implements have been found since this was written.—Ed.

In their dances, they use very many ornaments; the head is adorned with a feather head-dress, and they wear frontlets, nose shells, ear-rings, necklaces, arm shells, charms of various kinds, belts, and pubic shell.

They also carry in the hand a crescent made of wood, and adorned with feathers and a length of bamboo with a slit, and a bunch of dry nuts near the top.

They use wooden pillows of various kinds, but the most common kind is in the form of a crocodile, cut out of wood. A piece of wood is sometimes used, as also the stem end of the sago palm leaf. Many never use a pillow, especially the young.

Persons of the same name may marry, and a father may take his step-daughter and his own daughter to wife; but brother and sister, and cousins do not marry.

A sister is supposed to be given in exchange for a wife. If the young man has not a sister, he will borrow a girl from a family where there are several daughters. A man arranges with the girl of his choice, and at night goes stealthily and carries her to his father's house, and they sleep together. The girl is supposed to be stolen by the young man and his friends. In the morning, the girl is missed, and her father or uncle and his friends arm, and, amidst great appearance of wrath and loud shouting, make for the house of the young folks and surround it, demanding their girl. The young man's party issue out sometimes, and arrows are fired, and many hard and angry things are said. The girl's father is supposed to be very heart-sore at the loss of his girl, and he returns with his party again and again for several days, to the great delight of the girl, who feels she is a much loved daughter, and thinks how much she will be valued by her husband's family. In the future, when all is not honeymoon-sailing, and there are differences of opinion, she will remember her father's love, and remind her husband of the many times he came to fetch her, and of how his, the husband's, life was threatened for stealing her away. "Oh, that I had listened then to my father's calls, and had nothing more to do with you!" Sometimes she will leave her husband, and return home, and remain there until he feels lonely, and would like his wife back, when he gets food, and, if possible, a pig and some dress-ornaments, and proceeds to the father-in-law's house, to beg for his wife's return. The father will then tell how much he loves his beloved daughter, but seeing she did not listen to him at first, and they have lived so long together, and now he has come laden with presents, his daughter must return. At the time of initiation, and before it also, those looking forward to it must not eat birds, fish, grubs found in old wood, and male crabs. All others eat everything they can get.

The *Moguru* time (the initiation ceremony) is a period of general license, and in some respects very much resembles that at Maipua and the neighbouring district.

During times of sickness and epidemics, they blow conch shells, beat drums, throw fire sticks and keep up a continuous yelling for some time. When it is begun, all the women and girls run for the houses and remain there.

The island of Kiwai was first a small sand bank, but grew large, and then trees and other vegetation grew on it. The first man came from a bird's egg. The bird left the egg in the nest, and the maggot that came out of it became a man.

NOTES ON THE ELEMA TRIBES OF THE PAPUAN GULF.

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THAT a study of the tribes of the district of Elema may be intelligible to ethnological students, a few prefatory remarks are necessary in regard to names which have been used by previous writers, and semi-officially adopted by the Government in maps and published reports on this district.

Elema is the accepted name of the district on the coast of the Gulf of Papua, situated between Cape Possession in the east and the Alele River of the Purari delta in the west. The name "Elema" is probably a Motuan rendering of the name "Hereva," the name of one of the villages of the Moreaipi group, or it may be an adaptation of the name of a great chief, "Hereva-ape," who long ago ruled the Moreaipi tribe with a firm hand. The origin of this particular name may be immaterial, as the respective tribes of Elema do not seem to have had a common name for their district, but it is a matter of great importance that the Motuan names, so freely used by former writers on New Guinea, should be replaced by names, known and recognized as correct by the Elema tribes.

On entering upon a study of the Elema tribes, it must be remembered from the outset that these tribes are divided into two great groups. Those tribes whose tribal names end in "ipi" form one group; the other group includes all those tribes whose tribal names end in "ra," "u," "au." Of the former, or "Ipi" group, there are six tribes, all living on the coast, observing the same customs and claiming a common ancestry. Of the latter—the "a," "u," "au" and "ra" group—the "ra" and "u" tribes are represented by one tribe of each on the coast of Elema, and two "au" tribes in the immediate vicinity of the coast of this district. Of the origin and ancestry of the latter group of tribes, we are unable to gain much reliable information at present; it may be ultimately ascertained that they all claim a common ancestry with either the Parivau, or the Haura tribes.

Tribal names, and the names of villages in the district of Elema, will be found at the end of this paper.

What information we have of the origin and ancestry of the Ipi group of tribes is oral, and undoubtedly has much in it that has become mythical in the course of narration by the story-tellers of successive generations. It is not our object, at present, to say what is fable, or what we may consider as authentic, but to give the native version as it is narrated by the old men of the Moreaipi tribe;

and accepted by the other tribes of the "Ipi" group with slight alterations. The story is as follows:—

"The birthplace of our tribe was in the interior, somewhere near the east bank of the upper waters of the Purari River. No one living to-day knows the exact spot, but we know it was on this (the south) side of the mountain range, and our ancestors were acquainted with the upper waters of both the Purari and Vailala rivers. Our first male ancestor was named Ivu; he had no father or mother, he came out of the ground as plants and trees do. He came into existence at the base of a tree named Hoa, and the branches of this tree provided him with shelter, so that he continued to reside there. Whilst sitting under the shade of this tree one day, he noticed a number of seeds, in shape like sweet potatoes, and he sat musing and wondering if the seeds would grow and provide him with food until he fell asleep. In his sleep he had a dream, and again saw the sweet-potato-like seeds about him on every hand, but was surprised to see them moving as if they were living. He watched them come together, and was quite alarmed when he saw the seeds burst open, and from them grow up a tree of gigantic dimensions in front of him. This tree became the chief object of interest to him in his dream; it so fascinated him that he could not look away from it, and as he watched it more closely than at first, he noticed it had a huge hole in its trunk and a pair of legs, like his own, dangling from the hole in the trunk of the tree. He was frightened by this sight, and woke up with the ejaculation, 'My mother, the earth, has given me a wife.' He could not sleep again that night.

"At daylight he began a search for the tree he had seen in his dream, and soon found one resembling it in every detail, having a large hole in its trunk, and the legs of a human being dangling from it. On looking inside the hollow of the tree, he saw, reclining horizontally, a woman, and he knew she was the woman who was to become his wife. He pulled the woman out from the trunk of the tree by her legs, and told her she had been given to him as his wife by his mother, the earth. He named her 'Ukaipu,' which means, 'the spirit of the snake.'

"No other woman was known to exist prior to Ukaipu, and as she became the wife of Ivu, she was the first female ancestor of the 'Ipi' tribes. Ivu and his wife Ukaipu lived together under the shade of the tree Hoa; they had no knowledge of houses and housebuilding, and were content with their primitive home. To them were born two sons, the firstborn was named Haiapu, which means 'the god of the belly,' and his brother was named Lelevea, which means 'the chief of men.'

"To Haiapu was assigned the task of appointing guardian deities for all the customs to be observed by the posterity of the Ipi tribe. He named the gods whose duty it would be to preside over the feasts of the tribe, also the gods whose special charge would be the warriors of the tribe; almost every phase of the social life of the tribe had its respective deity, and it was Haiapu's work to make effigies of the gods he had appointed and named.

"Lelevea's special work was to plant and grow food for the gods Haiapu had appointed; for some time he did this to the satisfaction of Haiapu, but later he became dilatory, and Haiapu complained to Ivu, their father, because Lelevea had not brought enough food for the god of the warriors. On hearing of Lelevea's laziness, Ivu became very angry, and told his younger son to go away and make his home elsewhere; Lelevea would not go away, but set to work to raise a greater abundance of food than he had done previously. He succeeded in getting a large quantity of food, and took it to Haiapu, but he was so chagrined on learning from Haiapu that he had not gods enough to eat all the food he had procured for them that he went to Ivu and laid a complaint against Haiapu.

"Ivu recognized that his two sons were never happy together, so he determined that one of them should be sent away. He was dependent on Lelevea for food, and as Haiapu was the later offender, he decided to send him away from the homestead. He did so, and Haiapu crossed the Purari delta and ultimately reached Urama, in the Aird delta, where he settled down. Lelevea remained with his parents, and Ivu procured him a wife from the trunk of a tree, in the same way as his mother was found."

The above is the tradition preserved by the Moreaipi tribe; some of the tribes of the "Ipi" group enlarge on the foregoing, by stating that Haiapu found people living at Urama; that he married a woman of the Urama tribe, and together with his wife and many of her relatives, male and female, made a visit to Ivu and Ukaipu, his parents, who still resided at his birthplace. This visit was made an occasion of peace-making between Ivu and Haiapu, and later the Urama natives came in large numbers with Haiapu to visit his parents. Though it is not said definitely that some of the Urama natives settled with Ivu and Ukaipu, it is often assumed that they did, and that in that way the Ipi tribe was given its first impetus toward becoming a powerful tribe.

As the story of Elema and its tribes proceeds, the above assumption may appear to have a probability of truth in it; that need not concern us at present, as our next step is to ascertain how the original Ipi tribe came to be split into six tribes, and how, assuming the birthplace of the tribe to be far back in the interior of the Gulf hinterland, these tribes found their way to the coast.

It is not known to-day by whom the existing code of native laws was made. Ivu, the original male ancestor, is accredited with having decided that theft of property and immorality of the sexes were identical; hence both evils became known by a common name, and the death penalty was recognized as the common punishment for both crimes.

Which of the Ipi tribes living on the coast of Elema to-day was the first to split from the ancestral tribe, as it originally existed in the interior, tradition does not tell us; that it does not enlighten us on this particular is intelligible, as the cause of the split is said to have been adultery, a crime which carries with it unspeakable disgrace in the minds of the Ipi people, and is never referred to openly, except as an incitement to fight with bows and arrows on the occasion of a quarrel.

Tradition says that the first split from the ancestral tribe had a very serious influence on those families who still remained at the birthplace of the tribe. On the occasion of this split, it was thought by the tribe that the party which had left them would soon return to their home, very penitent and humiliated; they did not return, and this was taken as a good sign by other dissatisfied families of the tribe. Subsequently when quarrels took place among the respective families of the tribe, which were settled by the arbitration of the bow and arrow, the defeated party would set off in the trail of the previous split, and ultimately shape a migratory course of their own, which seemed to be direct south at first, and later to bear away to the east and south-east.

There is no reason to assume that the original Ipi tribe was suddenly dispersed by a rapid secession of its rebellious families; it is probable that long periods intervened between the respective secessions, and when a party did leave its home and people to migrate to the unknown, it was only when influential members of it had so flagrantly disgraced themselves and the tribe, that anything was preferable to living in a locality with a people ever conscious of the crime which had been committed.

The ancestors of the present Moreaipi tribe were the last party to desert the birthplace of the Ipi tribe, and of the respective tribes of the "Ipi" group to-day, the Moreaipi tribe only has preserved a record of its trek from the interior to the coast. This tribe seems to have made a direct, southerly course, keeping close to the east bank of the Purari river, as previous parties of their original tribe had hoped to do, but they were frustrated by a tribe of whose existence they had hitherto been ignorant. This unknown tribe was that of the ancestors of the present day Parivau tribe. The history of the Parivau tribe is a gory one, and no reference would have been made to it in this paper, if the native historian did not attach so much importance to it. He speaks of the original Parivau tribe as being very warlike, and very conservative against all intruders upon their territory.

It is generally acknowledged by the old men of the Ipi tribes to-day, that each party of their ancestors encountered the Parivau tribe, and fought with them for a passage through their country, but not being in sufficiently large numbers to defeat the Parivau braves, and not having any accurate knowledge of the country in which they were fighting, they changed their course, and ultimately reached the west bank of the upper waters of the Vailala river.

The Moreaipi, being the last party to make an attempt to get southward of the Parivau territory, met the Parivau people; but they found them in no mood for fighting or opposing their passage to the coast, as they had become very reduced in fighting strength, in consequence of having had to defend their country against each horde of emigrants trying to get south.

The Uaripi tribe claim precedence of arrival at the coast, having come over the Albert Range of mountains and down the Opau valley to the sea in Kerema Bay, where they had resided from time immemorial—that is, as time is regarded by natives.

It is claimed by the Milaripi tribe that they were the next party to arrive at the coast. They built their village on the land, occupied by their tribe to-day, about three miles east of the spur of the Albert Range, marked on charts as the "Cupola."

We are unable to ascertain approximately when the Kaipi tribe first arrived at the coast; it might have been almost simultaneously with the arrival of the Milaripi tribe. Be that as it may, until we can obtain definite information; the Milaripi and Kaipi tribes own most of the coast line in Freshwater Bay to-day, and so thin is the boundary line between their respective villages (a narrow creek) that a casual visitor would not know that they claim to be two tribes.

The Toaripi tribe terminated their migration southward for a long period about seven miles inland from their present villages at the mouth of the Williams river, and settled down in a village, now known by them as Eavara, but ignorantly named on maps, in gazettes, and by writers on the Gulf of Papua, as Mobiabi or Moviavi.

The Moaripi tribe is almost extinct, and the few individuals who remain to-day cannot be considered as representatives of an original party, who formerly split from the ancestal tribe in the interior.

The tribe that once bore the name of Moaripi is said to have been formed by a party, who seceded from the Milaripi tribe, living in Freshwater Bay. The details of this split, the formation of a new tribe, and the factors which contributed to the almost complete extinction of the tribe as such, must stand over for a future paper.

The ancestors of the present day Moreaipi tribe probably remained for some time at the ancestral home of the original Ipi tribe, as their migration to the coast was almost due south, and they had not the opposition from the Parivau tribe which their predecessors experienced in their efforts to get south. They were, however, the last party to reach the coast, and for some strange reason they crossed the mouth of the Alele and Purari rivers, and settled on the west bank of the mouth of the latter river, where they planted coconuts and lived in happy possession, until the Maipua tribe swept down upon them, and drove them into Orokolo Bay.

The tribe remained intact for a long time, and had no nearer neighbours on the coast to the east than the Uaripi tribe, living at Tairu-ma (Kerema), and the Maipua tribe on the west, who did not seem to aggress on the new soil claimed by the Moreaipi tribe. During a long period of peace and rest from fighting and travel, they grew into a large tribe, but family quarrels led to a tribal fight, with the result that the defeated party was driven out to seek a new home; this was found at the mouth of the Vailala river, where this split of the Moreaipi tribe has settled down and formed itself into an independent tribe.

Prior to examining the past history of the Ipi group of tribes for authentic information, we will proceed with the native versions relating to the past history of the "u," "au," "ra" group of tribes.

There are two tribes residing in the Elema district, whose tribal names end in "u": the Lepu tribe, occupying land and having villages about ten miles west of Cape Possession, the east boundary of this district, and the Muru tribe, having territory and a group of villages about eight miles inland of Orokolo, on the extreme west boundary of the district. Of the former tribe and its past history, the native storyteller has much to relate; he does not claim any knowledge of the origin of his ancestors, but begins with that period when "giants dwelt in the land," and names the chief of those giants as being "Vitai," the first male ancestor of the Lepu tribe.

The legends and traditions of the Lepu tribe might reasonably be thought to be plagiarised versions of Greek mythology from Homer's "Iliad," if it were known that the Lepu tribe had possessed classic scholars in the long ago; but as the tribe has been composed of units, as savage and barbarous as their neighbours from time immemorial, we can only take the traditions preserved for what they are, and content ourselves in this paper with such as give us a clue to the authentic history of this interesting people.

Omitting the myths associated with "Vitai," we come upon something of a more reliable nature when the storyteller introduces a man named Haisafarai. "In the long ago, when the Lepu tribe lived at a place named Misa, situated about three days' journey due north from the present villages of the tribe at Oikapu, Haisafarai, as a young man, became chief of the Lepu tribe. The special merits by which he attained the chieftainship were his integrity in keeping his word with everyone; his genius for anticipating the best interests of his tribe; his shrewdness in his dealings with antagonistic tribes. He was a skilled hunter, and, as such, was much appreciated by the young men of the tribe; he often led them on hunting expeditions which took them away from their home for many days in succession. During one of these hunting expeditions, he led his party southward, and, as it was unknown country to them, they requested Haisafarai to turn back; he declined to do so, and they continued with him until they arrived at the coast. On seeing the sea, they were all very much alarmed, and did not want to go any nearer to it, but Haisafarai prevailed on them to go with him to look at it. Whilst looking at it, they saw fish swimming about near the beach, and rushed into the water to secure them. Haisafarai determined to use the fish as a bait to allure his people to come and settle at the coast, but he knew his task would be a difficult one. He returned with his party to Misa; *en route* he imposed silence on them respecting their discovery. Later, he arranged for another expedition to the coast with the same party of young men, but was careful to let it be known in the village that they were going on a hunt for wallaby. Following the track they had made on their return from the coast, they soon arrived at the beach, and set to work to catch fish. They were so pleased with the fish they caught, that Haisafarai suggested building a lean-to for shelter at night when they visited the coast again on future occasions; the lean-to was speedily put up, and the party returned again to their bush home at Misa, killing what wallaby they met *en route.* Haisafarai knew that his secret could not be kept for long; he accordingly arranged for a course of action which would ultimately result in bringing his tribe to the coast to settle there permanently. He proceeded in this way: he made up a party for a large hunting expedition, and induced some of the older and more influential men of the tribe to join it; with his party, formed in accordance with his premeditated plans, he again led the way, and ultimately brought his party to the coast. On his arrival there, he made known his plans to his party; he informed them of his decision to stay there permanently, and advised the older men of the party to remain with him; he instructed the younger men of the party to go back to Misa, tell their friends that Haisafarai had found the sea and an abundance of fish, also, coconut trees and sago palms such as they had never seen, and entreat them all to come and live at the coast.

"Haisafarai's entreaties and suggestions were disregarded at first; most of the party left him, and returned to their bush village, thinking their chief, when left alone, would come back to his people. His wife and relatives became concerned when he did not return, and found their way to the coast to entreat him to come back to his home and people, reminding him that a desertion of the home of their ancestors could only bring disaster to the tribe. Haisafarai was obdurate, and the many attractions of the coast were so apparent to his kin, that they soon abandoned their entreaties of Haisafarai, and settled down in lean-to's, at first, as visitors, but later, as residents, and in that way the Lepu tribe made its first permanent appearance at the coast where its representatives are residing to-day."

The achievements of Haisafarai, as chief of the Lepu tribe, are the topics of many a conversation around the native camp fires and on the beach of the Elema coast, and many tribes in the Elema district, other than the Lepu tribe, have stories of this phenomenal man, not adding lustre to the deeds of their ancestors—and of his daring and courage; if one-half of these be true, he must have been a Papuan Hercules.

With our present knowledge of the other "u" tribe, the Muru tribe, it is inadvisable to make any definite statement in reference to its past history. The Muru people claim no kinship with the Moreaipi tribe, notwithstanding the fact that the two tribes have occupied adjacent territory for a very long period. We do not know that the Muru tribe was ever related to, or associated with the Lepu tribe by proximity of residence; an old man of the former tribe, a few years since, told the writer that his tribe and the Lepu tribe had originally a common ancestry.

There are two "au" tribes in the Elema district; both live in the immediate vicinity of the coast, but they do not seem to make any effort to come to the beach to reside. The Parivau tribe may be located by claiming for it the range of hills, extending from east to west across the tract of country situated between the Vailala and Purari rivers. It is doubtful if any branch of this tribe crosses the Vailala river, unless it is ultimately ascertained that the Opau tribe living in the Opau valley, at the back of Kerema Bay, is a split from the Pirivau tribe. What information has been acquired by the present writer respecting the Opau tribe suggests that it is made up of a number of families who seceded from the Muru tribe in consequence of adultery, probably not at a very remote date. It is always very difficult to get correct information concerning a tribe whose origin, as such, was the direct result of a breach from an original tribe on account of adultery; neighbouring tribes are equally reticent in referring to such tribes, even when they might have been the party wronged.

Of those tribes whose tribal names end in "ra," there are two in the Elema district, the Eavara and the Haura. It is doubtful if the former tribe can be considered as any other than a split from the Toaripi tribe at that period when the latter tribe moved from Eavara to reside at the coast. Tradition says the Toaripi tribe left Eavara, and came to the coast to settle about two miles west of the Williams river, at the mouth of which the tribe is living to-day in two villages. Soon after the new settlement was formed, a large number of the members of the tribe developed a bad form of ulcerated legs, which caused a deal of anxiety in the tribe. It was decided that the individuals afflicted with ulcers had been made the victims of sorcerers, and the sorcerers were supposed to be among the members of those families of the tribe who had opposed leaving Eavara for a new village nearer to the coast. A quarrel ensued which led to a tribal fight, the weaker party was driven away from the new village, and returned to Eavara, where it has remained, and has grown into a large tribe. Friendly intercourse has been established between the two tribes within recent years, but socially to-day they are as two independent tribes.

The Haura tribe has only made its appearance at the coast, with the intention of making a claim on the coast line for future settlement, within the past few years. The representatives of this tribe, now on the coast and in its immediate vicinity, are all located between the east bank of the Vailala river, and the spur of the Albert Range, known as the "Cupola," the east boundary of Kerema Bay. These communities are known, in every-day parlance, by the names of the respective localities in which they live, as Helau, a village near Vailala; Keakea, another village a few miles east of Vailala and Hai (Motuan name, Keuru), about midway between Vailala and Kerema.

Each community is small, but it is constantly being fed by a chain of villages, probably extending from the coast to the mountain range, at the head of the Vailala river. The writer of this paper has explored the upper waters of the Vailala river, much higher up than any other European has yet reached, and has found representatives of the Haura tribe in the neighbourhood of the German boundary. By occasional visits to tribes living on the east bank of this river, and a casual acquaintance with their movements, he has observed for many years a marked tendency to migrate coastward.

Of the past history of the Haura tribe, we cannot advance anything of an authentic nature at present, but it is interesting to note here that this tribe, alone among the Elema tribes, has a story of a woman cohabiting with crocodiles, and bearing human progeny, who became the ancestors of the tribe.

As a note to the foregoing, the following conclusions may be deduced:—

(1) At a very distant period in the past, the ancestors of the present day group of "Ipi" tribes lived in the interior, possibly somewhere near the lower altitudes of the Maikikiria range of mountains.

(2) From time immemorial, there has been a tendency among these tribes to migrate southwardly, wittingly or otherwise, toward the coast.

(3) There is a probability of the present day tribes having split from one ancestral tribe in the long ago, and, during the period of migration, forming themselves into individual tribes.

(4) That each party of emigrants coastward met with a check from tribes living in the Gulf Hinterland, and had to change their course from south to east and south-east.

(5) There is also an indication that what seems to have been done by the ancestors of the "Ipi" group of tribes, is still being done to-day by the Haura tribes.

It would be futile to speculate upon the length of time occupied by the respective tribes of the "Ipi" group in their migration from the interior to the coast, and equally so to fix an approximate period for the arrival of these tribes at the coast. The period of migration was, undoubtedly, long and tedious, and had many halting places *en route*. With our present geographical knowledge of the interior of the Elema district, it is impossible to state, definitely, the routes followed by the emigrants, but we may assume, subject to correction with a fuller knowledge of the Gulf interior, that all the Ipi tribes on the coast to-day—with the exception of the Moreaipi tribe—when being checked by the Parivau tribe, made a course due east until they reached the west bank of the Vailala river. In course of time, they crossed this river, or came down on its waters, until they reached a large tributary running into the main body of the river from an easterly direction.

The Uaripi tribe probably abandoned their canoes very soon after entering this tributary, and came over the Albert Range, down the Opau valley, to the coast. The Milaripi and Kaipi tribes, probably kept near the interior base of this range, and came out to the coast in Freshwater Bay, whereas the Toaripi tribe might have followed the tributary until they found it had a branch, sending some of its water south-east behind the ranges, and having an outlet in Freshwater Bay, named the Tauri River.

It matters not in what spirit we approach a study of these tribes, we may have little patience, and less interest in their version of their past history, so mixed up with myths and legends, yet we cannot afford to dispense with their evidence as being altogether fabulous and mythical; and, whilst we are fully aware that much of the information gained may, by further inquiry, need to be considerably modified, yet we cannot but think that we are right in giving such information as has been acquired, as a preliminary to a more complete study at a future date.

The following list of names is appended with the hope that it may be of service in substituting for existing Motuan names, the names known and recognized as correct by the respective tribes of the Elema district.

The geographical order adopted here is from east to west, *i.e.*, from Cape Possession to the Alele river.

Native Name of Villages.	Tribes.	Motuan Name of Villages.
Oikapu	Lepu	Oiabu or Oiapu.
Fave	Moaripi	Jokea.
Miaru	„	Biaru.
Moaripi	„	Lese.
Toaripi	Toaripi	Motumotu.
Eavara	„	Mobiabi or Moviavi.
Kuaru	Kaipi	Karama.
Kaipi	„	„
Milaripi	Milaripi	Wamai.
Levu	„	Silo.
Siviri	Uaripi	Ipisi.
Koroeta	„	Not named.
Uaripi	„	Kerema.
Mai'i	„	„
Hai	Hai	Keuru.
Keakea	Hai ?	Not named.
Haura	Haura	„
Haita	Moreaipi	Vailala.
Auva	„	Not named.
Hereva	„	Orokolo.
Moreaipi	„	„

Note.

It should have been stated in vol. xxxii, p. 425, of this *Journal*, that Figs. 1 and 2 of Plate XLI were kindly drawn by Mrs. Sexton from specimens given her by Mr. Holmes.—[Ed.]

A CONSIDERATION OF SOME OF THE MORE IMPORTANT FACTORS CONCERNED IN THE PRODUCTION OF MAN'S CRANIAL FORM.

By Arthur Thomson, M.A., M.B., Professor of Human Anatomy in the University of Oxford.

[Presented June 9th, 1903. With Plate XXIII.]

The subject I propose to discuss is the vexed question of cranial form and the significance of the cephalic index. I know full well that the matter has engaged the attention of many more competent than I. Yet I think there are aspects of the case which have been overlooked, or at least insufficiently commented upon, and that must be my excuse for venturing on what at first sight seems a threadbare topic.

For purposes of convenience, it may be well to group the influences at work in the determination of cranial form under two heads:—

(*a*) Those operative from within.
(*b*) Those operative from without.

The former includes such factors as volume of brain, compensation as to balance, growth of sutures, heredity, and breeding. The latter embraces muscular influence, more particularly that associated with the development of the jaw, which latter is intimately related to the size of teeth, and consequently, associated with diet. In this way environment plays a part in the modification of man's cranial form in the same manner as it is productive of the variety of skull shapes met with in other types.

I propose to deal with the mechanical influences enumerated under (*b*), first, because I shall have most to say on this subject, and because if novelty there be in any of my observations it is mostly concerned with this aspect of the question.

As long ago as 1867 John Cleghorn[1] with much foresight advanced the opinion that "all questions relating to man resolved themselves into a food question, and that again into a soil question, and that again has been determined by our laws of winds and currents." I quote the foregoing, because it seems to me to express very forcibly how intimately man's physical development is associated with his environment.

Herbert Spencer[2] and Darwin[3] both refer to the influence of food, the former explaining how in savages the greater use of the jaws in chewing coarse and uncooked food would act in a direct manner on his masticating muscles, and on the bones to which they are attached, whilst the latter considered it impossible to avoid the conclusion that better food and greater comfort have an influence on stature.

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[1] *Memoirs of the Anthropological Society of London*, vol. iii.
[2] *Principles of Biology*, vol. i, p. 455.
[3] *The Descent of Man*, 1871, vol. i, p. 115.

It will be convenient, therefore, to consider briefly the evidence available from an examination of the teeth. The first to draw attention to this matter, apart from the morphological details of man's dentition, with which we are not at present concerned, was the late Sir William Flower.[1] By comparing the space occupied by the crowns of the premolar and molar teeth with the basi-nasal length, he obtained the dental index, thus :—

$$\frac{\text{Dental length} \times 100}{\text{Basi-nasal length}} = \text{Dental index.}$$

As a result of his investigations, he found that the proportion so expressed enabled him to classify the races of man into three groups, the Macrodont, the Mesodont, and the Microdont, corresponding pretty closely to the three great divisions of mankind, the Negroid, the Mongoloid and the Caucasic, thus proving that the transition from the lower to the higher type is accompanied by a gradual reduction in the size of the teeth.

Madeleine Pelletier[2] has pointed out that in the evolution of any organ in which function is associated with movement, the most rapid changes take place in the muscular part of the apparatus whilst the passive parts involute more slowly. According to this view, therefore, the muscles and muscular processes of the masticatory apparatus undergo more marked alterations in their development than do the passive agents, in this instance, the teeth, so that if we accept this view we lay more stress on the development of the jaw than on the size of the teeth.

It must be obvious, however, that the larger teeth necessarily involve an increase in the length of the alveolar border, though exceptions to this rule are referred to by Regnault,[3] who states that in the negro the lateral borders of the incisor teeth are more divergent than in whites, thus providing a more extensive cutting edge; whilst Windle,[4] in studying the variations met with in the domestic dog, points out that in dogs with long and short jaws there is little or no variation in the relative size of the teeth, the shortening of the upper jaw being produced by the complete or partial rotation of the second and third premolars.

The regressive changes which the molar teeth are undergoing as regards their relative proportions to each other are also important. The wisdom molars are being gradually reduced in size, and in the character of their roots, as first pointed out by Owen[5]; whilst the second molar seems also undergoing a diminution in its diameters.

Hüter[6] points out that the increase in the number of molar teeth at the second dentition is the cause of the increased growth of the molar segment of the body of

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[1] *Journal of the Anthropological Institute*, vol. xiv, p. 183.

[2] *Bull. de la Soc. d'Anth.*, Paris, 1902, p. 537.

[3] Quoted from Tomes, *Dental Anatomy*, 5th Ed., p. 523.

[4] *Proc. Zool. Soc. London*, Jan. 14, 1900.

[5] *Odontology*, London, 1840-50.

[6] *Virchow's Archiv*, bd. xxix, p. 21.

the mandible, whilst the incisor segment having always the same number of teeth does not grow in the same ratio.

That the length of the body of the mandible, however, is not entirely dependent on the size of the teeth is proved by M. Pelletier's[1] observations. In the lower races of man there is always a greater space behind the last molar tooth (*diastema post molaire*) than in the more advanced and highly civilized. Granting, however, that larger teeth require larger jaws, we must be careful to note that the jaw need not necessarily be more projecting. The length of the alveolar arch may be the same in two specimens, though the one displays a parabolic curve with consequent projection, whilst the other assumes an elliptical form with less forward thrust. In one case the jaw will be associated with a narrow, in the other with a broad face.

Hitherto I have confined my remarks to differences in the size of the teeth; it may be well to remind you that a reduction in their number is also taking place. It is an accepted fact that in the higher races the wisdom tooth is more frequently absent than in lower types, and Windle[2] in a paper on "Man's lost incisors," shows how the evidence is accumulating that a suppression of the two present lateral incisors is gradually taking place.

In contrasting the more highly civilized with the more degraded races of mankind, it is therefore obvious that we must take into consideration the changes produced not only by a reduction in the size of the teeth, but also by a diminution in their number.

In considering the relation of the size of teeth to the size of jaw we must endeavour to determine how they interact on one another. The bulk of the evidence seems to me to point to the teeth as the determining cause. Madeleine Pelletier[3] justly holds that the teeth are the parts of the masticatory apparatus which undergo the least change in the phylogeny of the race. The loss or attenuated condition of the wisdom teeth is often attributed to want of space in the jaws during the formative period of growth of the tooth germ.[4] Keith,[5] however, has pointed out, that even in the apes, the dental germs of the molar teeth are lodged in relation to the posterior border of the superior maxilla, and are only brought into the alveolar line by the subsequent expansion of the bone. It would seem, therefore, that such an arrangement is to be regarded as the normal condition of growth, and the occurrence of such displacement in man need not be accepted as evidence of a perversion, but may be due merely to lack of vitality in the germ itself leading to the imperfect development of the alveolus around it.

The most striking evidence of the influence of the dentition upon the jaws is seen in the apes, during the period of the eruption of the permanent teeth. Dr. Keith, to whom I am much indebted for placing at my disposal his, as yet unpublished investigations on Anthropoid Anatomy, has clearly demonstrated the correlation which exists between the eruption of the teeth and the size of the mandible, as well as the expansion of the temporal fossæ in these apes.

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[1] *Bull. de la Soc. d'Anth.*, Paris, 1902.

[2] *Journal of Anat. and Physiology*, vol. xxi, p. 84.

[3] *Loc. cit.*

[4] Tomes, *Dental Anatomy*, 5th Ed., p. 522.

[5] *British Journal of Dental Science*, London, vol. xlv, No. 826.

The same holds good in man, though the evidence is less satisfactory. Pruner Bey[1] states that the negro child is born without prognathism, and only begins to display that characteristic after the advent of puberty. Dr. Ales Hrdlicka,[2] on the other hand, asserts that the faces of coloured children are generally more prognathic than those of white, and that the prognathism is both facial and alveolar; he further observes[3] that the irregularities in the setting of the teeth, so common in white, are rare in coloured children, in whom the dentition is much more regular. The apparent discrepancy between these statements may be accounted for by the fact that Dr. Hrdlicka did not apparently make any observations on children below the age of 5 years. This is just one of the points on which we wish more information, and doubtless, were attention drawn to it, an accurate record of the conditions could be easily obtained.

The foregoing observations all point to the soundness of the assumption that jaw development is dependent on the size and number of teeth. It may, however, be profitable to consider briefly what other influences, if any, are concerned in the development of the jaw. Darwin[4] drew attention to the correlation which seems to exist between the development of the extremities and the jaws, whilst Welcker and Leuckart[5] have suggested that prognathism in man is a relic of the time when the jaws were used for prehensile purposes. Dr. Fauvelle[6] attempts to explain the reduction in size of the jaw and the increased growth of the cranium as dependent on the altered vascular supply determined by the distribution of the internal and external carotid arteries as contrasted with the course of the primitive circulation. Virchow[7] as far back as 1854 referred to the secondary deformations of the jaws which may result from mechanical causes connected with the increase in size of the tongue. Recently W. A. Lane,[8] in discussing the influence of adenoids on the form of the face, holds that the complete development of the lower jaw is largely dependent on the growth of the tongue.

Whilst willing to admit that the agencies above cited may have some effect in determining the size and form of the mandible, I have not been able to obtain any evidence confirmatory of their influence under what we may regard as normal conditions. Absence of the tongue is an extremely rare condition, and is usually associated with congenital defects of a grave kind. Considering the two-fold function of the tongue as an aid to speech and mastication, we might have expected to have met with evidence, supporting the view put forward by Lane, in cases of deaf-mutism. Dr. J. K. Love,[1] however, states that "the jaws were formed strong and well developed. The dental arch was well developed as a rule," and there were only three V-shaped palates among those examined.

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[1] Quoted from Carl Vogt. *Lectures on Man*, London, 1864, p. 188.

[2] *Anthropological Investigations on 1,000 White and Coloured Children of Both Sexes*, New York (no date, 1899 ?), p. 348.

[3] *Ibid.*, p. 349.

[4] *Variation of Animals under Domestication*, vol. i, p. 173.

[5] Quoted from Daffner. *Das Wachstum des Menschen*, Leipzig, 1902, p. 303.

[6] "Appareil masticateur selon l'alimentation." *Bull. de la Soc. d'Anth. de Paris*, 1888 p. 463.

[7] Virchow. *Archiv für path. Anat. u. Physiol.*, vol. vii, p. 133.

[8] *Brit. Med. Jour.*, Sept. 6, 1902.

From the present standpoint it therefore seems that these minor influences may be disregarded as factors of much importance in the determination of jaw form.

Passing next to a consideration of the influence exercised by the mandible on man's skull we have to consider, first, the size and form of the jaw itself, and second, the development of the muscles which control its movements. A casual examination of most mammalian skulls clearly demonstrates the fact that the head form is to a great extent controlled by the magnitude and development of the masticatory apparatus. The case is perhaps most strikingly exemplified in birds, in which the modification in form and size of the beak determines the shape of the cranial part of the skull.

The effect of the jaw on the configuration of man's head has been widely recognized both as regards the face and the cranium. I need not quote the views of Welcker,[2] Aeby,[3] Vogt,[4] Schaafhausen[5] which are so well known, but I may refer briefly to some more recent observations. Daffner[6] points out that the more the jaw projects the further back the hind part of the head extends. Brinton[7] correlates prognathism with dolichocephaly, inferring that the latter is brought about by the compression exercised by powerful temporal muscles associated with a large jaw. Tomes[8] discusses the closure of the intermaxillary suture as a possible cause of prognathism, for in the gorilla the antero-posterior length of the premaxilla increases from 19 mm. in the period of complete deciduous dentition, to 22 mm. in the female, and 27 mm. in the male, at the period of adult dentition. In the orang from 11 to 15 or 18 mm.; in the chimpanzee from 8 to 14 or 19 mm., whereas in man no growth takes place in this region.

In regard to jaw projection the matter is further complicated by the growth of the upper part of the face. As Cleland[9] has shown there is a difficulty in differentiating between forward and downward projection of the jaws.

Secondly, in regard to the muscles which control the movements of the jaw, their bulk will to some extent be regulated in each particular individual in conformity with the rest of the muscular system. As will hereafter be shown however, the growth of the mandibular muscles will also be determined by the size, form, and disposition of the bone which they have to move. The amount of force which they exercise upon the jaw will also react upon the bony surfaces from which they spring, and as it is from the under surface of the cranial base, from the zygomatic arches, and from the temporal fossæ that they arise, it is there that we must look for the results of their secondary effects. Leaving out of the question, for the time being, the masseter and pterygoid muscles, it is, of course, common knowledge that the area of attachment of the temporal muscles varies greatly in different skulls. Remember that these muscles derive their origin from the sides of the cranial box, which is here ossified in membrane, and note that even in the adult, each muscle overlies the complicated series of sutures which form the region of the pterion, an area which corresponds to the embryonic antero-lateral fontanelle. Here then we are dealing with a part of the cranial wall less capable of resisting continual pressure, and more susceptible to the influence of prolonged strain. No one who has handled many skulls can have overlooked the remarkable differences displayed in the area and outline of the temporal fossæ. A more careful examination shows that the most extensive areas of attachment of the temporal muscles are met with in skulls of a dolichocephalic type, and are in most instances correlated with a prognathous face. The most striking confirmation of this is advanced by Dr. Keith, who has been able to trace the ascent of the temporal ridges over the side of the calvaria in anthropoid apes in correlation with the eruption of the permanent teeth, and the consequent enlargement of the jaw. What holds good in these animals must of necessity apply to man, though, in the case of the latter, there may be other factors which mask to some extent the more pronounced effects displayed in the apes. It has been widely recognized that the young of the anthropoids have much rounder heads than the adults, and the alteration in shape which takes place during growth is largely dependent on the influence exerted by the powerful muscles of the mandible. In the case of these animals this influence is paramount, and is little affected by the increase in the volume of the cranial contents, which is so essential a feature of man's development.

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[1] *Deaf-Mutism*, Glasgow, 1896, p. 22.

[2] *Untersuchungen ueber Wachstum und Bau des Menschl-Schüdels*, Leipzig, 1862.

[3] *Die Schädel formen des Menschen und des Aften*, Leipzig, 1867.

[4] *Lectures on Man*, London, 1864.

[5] *Anthropological Review*, vol. vi, 1868, p. 412.

[6] *Das Wachstum des Menschen*, 1902, p. 302.

[7] *American Anthropologist*, vol. vii, p. 377.

[8] *Dental Anatomy*, 5th Ed., p. 520.

[9] *Philosophical Transactions*, 1870, p. 152.

Whereas in the anthropoids the average cubic capacity of the adult exceeds that of the young animal by from 50 to 150 cc., the figures given by Topinard[1] show a difference of 978 cc. between the cranial capacity of infants a few days old and children of 15 years of age.

It is interesting to note, as Dr. Harrison Allan[2] has pointed out, that there is a tendency in many mammals for the masseter and temporal muscles to unite, the deep part of the former being continuous with the superficial part of the latter. Man and some of the rodents are exceptions to this tendency, though Allan himself records that in the dissection of a mulatto child at term he found the deeper plane of masseteric fibres arising from the external surface of the temporal tendon. He further quotes Quain to the effect that some of the posterior temporal fibres arising from the temporal fascia blend with the deep fibres of the masseter. The union of the muscles in man, however, is a rare anomaly. Macalister[1] has only met with one case.

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[1] *Eléments d'anthropologie générale*, p. 642.

[2] *Proc. of the Acad. of Nat. Sc. of Philadelphia*, 1880, p. 385.

It seemed possible that some light might be shed on the influence of the masticatory apparatus on cranial form in those cases where either arrest or excess of development, or immobility of the jaw, had led to functional changes in the growth of its associated muscles, and consequently on their secondary influence on the bones of the skull. The evidence forthcoming is, however, not very satisfactory from our point of view. Ogston,[2] in a paper in which he deals with the congenital malformations of the lower jaw, sums up his conclusions as follows:—"Such deformities are rare, non-development is not recorded in man. Excessive development does occur but is rare, and the accounts are incomplete. Congenital smallness of the lower jaw is associated with symmetrical deformations elsewhere, and lead in after life to acquired deformities of the bones of the face and cranium. Unilateral deformation is accompanied by asymmetry." In a case of unilateral deformity which he describes, the bulk of the tongue on the right side was less than that of the side corresponding to the deformation, thus apparently establishing a correlation between the growth of the two organs. Boullard[3] describes a case of absence of the condyle and atrophy of the coronoid process in which there was deformation of the face on the same side. Sir G. M. Humphrey[4] gives an account of an instance of atrophy of the lower jaw from disuse, but though he gives a portrait of the lad, it is impossible to make out what effect this may have had on the cranial form. It is interesting to note, however, that although the mandible was less by 2 inches than normal, the teeth, which are splayed in it, are not reduced in size, although they have been rendered useless, a circumstance which would appear to support the views expressed by Pelletier (see *ante*).

In cases of acromegaly, an increase in the area of attachment of the temporal muscle and more pronounced temporal ridges have been recorded.

On such evidence as the foregoing, the influence of the jaw and its muscles on the determination of cranial form has, in a general way, been recognized, but no attempt, so far as I am aware, has hitherto been made to estimate with more precision what these possible effects may be.

J. Gorham[5] in a most interesting and instructive paper on the "Leverage of the lower jaw," discusses the mechanical advantages of the disposition of the teeth according to their weight, and estimates accurately the force necessary to raise them together with the jaw.

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[1] *Trans. Roy. Irish Acad.*, xxv, 1872, p. 18.

[2] *Glasgow Medical Journal*, 1874, N.S., vol. vi, p. 288.

[3] *Bull. de la Soc. Anat.*, Année 23–24, p. 283.

[4] *Med. Chir. Trans.*, 2nd Ser., vol. xxvii, 1862, p. 288.

[5] *Medical Times and Gazette*, 1875, vol. i, p. 28.

The method I have employed is somewhat similar, but, as will be seen, I am more concerned with the estimation of the force exerted by the muscles on the cranium, than on the teeth. In considering the influence of the jaw upon the cranial form, I would like to emphasize the fact that the correlation of the proportions of the mandible with the head-form is by no means so easy a matter as might at first appear. We have to remember that the mandible is a lever, the fulcrum corresponding to the temporo-maxillary articulation, the force being applied at the coronoid process and around the angle, whilst the resistance is distributed along the alveolar border. But be it borne in mind that this lever undergoes modifications in a variety of ways, and that these variations are not always similarly grouped, but may be compounded in divers ways. First, it must be remembered that the temporo-maxillary articulation is not a simple hinge joint, but is a combination of a sliding movement in an antero-posterior direction, and a rotation around a horizontal axis transversely disposed. I have said transversely disposed, for the sake of clearness, but as a matter of fact the condyles are inclined obliquely from without, inwards, and from before, backwards. This is not a matter of immediate moment, however; what I wish to lay stress on is that, in considering the movements of the jaw, we have to deal with a lever in which the position of the fulcrum is constantly changing with the opening or closing of the mouth. In order to overcome this difficulty, in my subsequent observations I have treated the mandible as acting as a lever when the jaws are closed, and this, as will be seen hereafter, has enabled me to estimate the amount of force necessary to apply to the lever in order to exercise a certain amount of pressure "at the bite" in the region of the incisor teeth; in this way I have been able to reduce the mechanism to its simplest form.

In considering the disposition of the teeth in the mandible, we are faced with this difficulty: a jaw, long in proportion to the width which separates its condyles will necessarily display a form in which projection combined with a narrow and elongated arch (parabolic) is the characteristic shape, whilst a jaw in which the condyles are widely separated will exhibit an alveolar arch much more open (elliptical) and consequently less protruding, though at the same time the total length for the setting of the teeth may be the same in both instances. This correlation between the width of the jaw and its length seems to me an important matter, and one hitherto overlooked. Up to the present, the measurements usually adopted to express the form of the mandible have been, symphysial height, coronoid height, condylic height, gonio-symphysial length, intergonial width, and breadth of ascending ramus. For very obvious reasons I think these measurements are practically useless. Far be it from me to wish to add to the burden of the already unnecessarily large number of measurements, but I must urge the importance of employing such measurements as will enable us to arrive at some definite conclusions regarding the forces and principles involved in the maxillary mechanism.

As I have already said, bearing in mind that the mandible is a lever, it is of paramount importance that we should be able to record the length of the lever. This unfortunately we cannot do by any of the more usually adopted methods, and I propose to gauge this by measuring the condylo-symphysial length. This I do by placing the jaw so that it rests on the inferior border of its body, whilst the posterior edges of the condyles lie in contact with a perpendicular surface raised from the horizontal on which the body of the jaw rests; another perpendicular is then advanced until it comes in contact with the symphysis; the distance which separates the two perpendicular planes may be regarded as approximately representing the length of the lever. A much more important measurement in my opinion than the intergonial width is the intercondylic width. This is readily ascertained by taking the maximum measurement between the outer surfaces of the condyles. My reason for considering this measurement of greater value than the intergonial width is because it provides us with a means of correlating the jaw with the base of the skull, a narrow base being associated with a narrow intercondylic width, whilst a wide base will involve increased width between the condyles This leads us further, for whilst it is true that the measurements of the base vary less than those of the vertex, we are justified in correlating a narrow base with dolichocephaly, whilst a proportionately wide base is the concomitant of brachycephaly.

But an examination of a large number of jaws at once discloses the fact that the proportion between the mandibular length and the mandibular width (represented in each case by the condylo-symphysial length and the intercondylic width) varies greatly. This variation can be best expressed by an index obtained thus:—

$$\frac{\text{Condylo-symphysial length} \times 100}{\text{Intercondylic width}} = \text{Mandibular index.}$$

This I propose to call the mandibular index. As will be seen, I have taken the width as the standard of comparison, so that when the index is high it means that the jaw is long proportionately to its width, whilst when the index is low, the jaw is short relatively to its width.

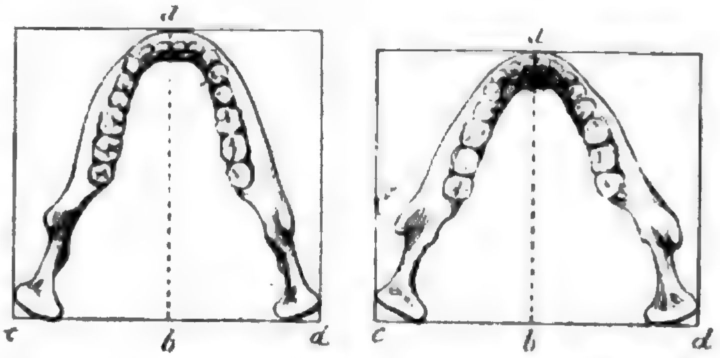

FIG. 1.—To illustrate the proportions of two different types of mandible, the one relatively long, the other relatively short to its breadth.
ab. Condylo-symphysial length.
cd. Intercondylic width.

From the examination of over 50 jaws I have found that this index ranges from 74 to 100. The former belonged to a skull with a cephalic index of 88, whilst the latter was the jaw of an Australian with a cephalic index of 67. Grouping together the indices of the series of the skulls examined, I find that 13 brachycephalic skulls yield an average mandibular index of 84·8 ; 11 mesaticephalic skulls yield an average mandibular index of 88·8 ; whilst 20 dolichocephalic skulls yield an average mandibular index of 90·6.

There thus seems ample proof of a distinct correlation between jaw length and head length.

So far the problem has resolved itself into a question of the length of lever, and it is obvious that the longer lever must require a proportionately greater force to produce the same result as that obtained by the shorter lever. Were the forces always applied at the same point, the calculation of the muscular effort to produce the same results in jaws of different lengths would be simple, but unfortunately we find that the point where the force is applied shifts considerably, so that in the case of two jaws of equal size and proportions we may have one acting with much greater mechanical advantage than the other, owing to the fact that the force may be applied at a greater distance from the fulcrum.

Disregarding for the time being the action of the masseter muscle as an elevator of the jaws, it is evident that the force we have mainly to consider is that generated by the temporal muscles. The moment of the force due to this muscle is exercised through the coronoid process, and it is manifest that the disposition of that process in relation to the fulcrum, or condyle, will exercise an influence on the mechanical advantage with which the jaw acts. It is therefore a matter of importance to determine if possible the varying position of this process in relation to the length of the jaw, meaning thereby the condylo-symphysial length which we have adopted as our standard of length.

Hitherto the width of the mandibular ramus has been the measurement employed to express this feature in the architecture of the bone, but for reasons which will be apparent to those who have handled any considerable number of inferior maxillæ, this method can hardly be considered satisfactory. The variety of form displayed by the coronoid process is very great both as regards elongation, set, and breadth. It has seemed to me, therefore, taking all these facts into consideration, best to disregard variations of a kind similar to those mentioned, and assume that the summit of the process corresponds to the point where the greatest strain of the muscle is exercised on the bone. The method is not entirely satisfactory, but for lack of a better it must serve. Taking then the distance of the summit of the coronoid process from a perpendicular in contact with the posterior edge of the condyle, we get a measure—the condylo-coronoid width, which fairly accurately represents the disposition of the summit of the coronoid process in the particular specimen examined, but in order to estimate the relation of this to the length of the jaw we must employ an index which expresses the proportion of that measure to the length of the jaw = 100. This we do by the following formula:—

$$\frac{\text{Condylo-coronoid width} \times 100}{\text{Condylo-symphysial length}} = \text{Coronoid index.}$$

I find from a comparison of the specimens I have examined that this index ranges from 43 to 31. That is to say, assuming that the force is applied at right angles to the lever and also that the coronoid process always lies in the same horizontal plane as the lever, the jaw with a high coronoid index (for that seems to me a convenient term to employ) will act, provided the same force is applied, to a proportionately greater advantage than one with a low coronoid index, for in the case of the jaw with the high index, the force is applied at a point further removed from the fulcrum than in a mandible with a low index.

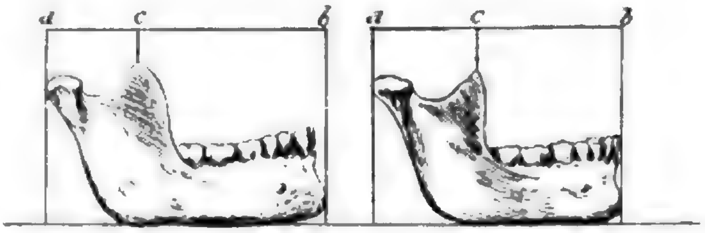

FIG. 2.—To illustrate the difference in the disposition of the coronoid process relatively to the length of the mandible.
ab. Condylo-symphysial length.
ac. Condylo-coronoid width.

In estimating the amount of force necessary to effect the same result in the masticatory apparatus of two skulls, we have thus two factors to consider. First, the length of the lever or jaw as a whole, and second, the disposition of the force on that lever. The subject thus becomes vastly more complicated than before, for an examination of a large number of specimens proves that these two factors do not always interact upon each other in the same way. Thus we may have a long mandible, which would obviously require the exercise of greater muscular force to discharge its functions were it not that this is compensated for by the fact that that force is applied at a point more remote from the fulcrum than is usually the case. On the other hand, a jaw of similar proportions, owing to the fact that the coronoid process lies closer to the condyle, may require a much greater muscular effort to produce the same result. Conversely, a short jaw may be acted on by a force applied close to or remote from the fulcrum with corresponding results as to the expenditure of muscular energy.

I have endeavoured to establish a correlation between the position of the coronoid process and the mandibular length by correlating the mandibular and coronoid indices, but whilst it appears that the longer jaws have as a rule the higher coronoid indices and *vice versâ*, the rule is by no means invariable, and from the data at my disposal I am unable to express any definite conclusion.

There seems, however, to be a correlation between the coronoid index and the cephalic index, for I find that the higher coronoid indices are more usually associated with dolichocephaly, whilst the lower coronoid indices are met with in skulls of the brachycephalic type. The number of observations, however, is too few from which to draw any conclusions.

Since it appears that we are unable to harmonize the counteracting influences of the two factors at work in the mechanism of the masticatory apparatus, it occurred to me that perhaps the best way to attempt the solution of the question would be to determine experimentally the amount of force necessary to overcome the same amount of resistance in the different jaws under examination.

As the reader will understand, my object in thus studying the mandible has been to attempt to estimate in each particular skull the amount of force exercised by the temporal muscle to produce a like result. Were we successful in doing this, we should be able to form some idea of the relative developments of the temporal muscles and thus see whether, as I have already hinted, this development of the muscle has any correlation with the cephalic index, and if that be so whether we are justified in regarding it as one of the predisposing causes in cranial formation.

With this object in view, I made a series of experiments on a number of jaws selected from skulls, the measurements of which were known and the cranial forms of which displayed every variety of shape. An apparatus was devised in which a horizontal ledge was affixed to the surface of a vertical plate; this latter was capable of movement so that it could be raised or lowered, thus altering the position of the ledge which was joined to it. The jaw being placed on a horizontal plane so that the inferior border of its body rested on that plane, the perpendicular plate was then raised or lowered until the under surface of the projecting ledge rested lightly on the upper surface of the condylic articular surfaces; the jaw so disposed was now loaded with a weight of 100 grammes clipped over the edges of the incisor teeth; this was to represent the resistance to be overcome. Over the jaw thus placed projected one arm of a balance, so equipped that by means of a convenient adjustment a force could be applied to both coronoid processes by loading the scale which hung from the end of the other arm of the balance. The application of this force at once converted the mandible into a lever of which the fulcrum corresponded to the condyles now pulled upwards against the under surface of the projecting ledge. It was necessary to exercise considerable care in the adjustment of this apparatus, and the method I found most accurate and convenient was to pierce the coronoid process 3 mm. or so beneath its highest point; through the holes so made steel pins were inserted to which the threads transmitting the force were fixed. It soon became obvious, however, that the force necessary to produce a like result varied with the direction of its application, just as it does under natural conditions, according to the angle at which the jaw is disposed in relation to the cranio-facial axis when the mouth is closed. To overcome this difficulty did not seem possible under the conditions of this experiment, so I contented myself with arranging the apparatus so that the force acted at right angles to the horizontal plane upon which the jaw rested. At the same time, however, I made two series of observations when estimating the weight necessary to act as a counterpoise to the jaw loaded as above described with the 100 gramme weight fixed to the incisor teeth. In one series the weight necessary to just raise the jaw from the position in which its inferior border rested on the horizontal plane were noted, in the other series of observations the ledge against which the condyles projected was raised so as to enable me to alter the position of the jaw to one in which the biting plane or the crowns of the teeth occupied a horizontal plane. In this altered position, the weight necessary to raise the loaded jaw was also recorded. It at once became apparent that a considerably less weight was necessary to counterpoise the jaw in this position than in that in which it rested on the under surface of its body, due entirely to the difference in the angle with which the force acted on the lever. Without, however, concerning ourselves with that matter at present, let me say that in each series I found the range of the weight necessary to act as counterpoises to the loaded jaw varied considerably. Thus with the jaw loaded with 100 grammes over the incisor teeth, and placed so that the biting plane was disposed in the horizontal, I found the weights used to effect a counterpoise ranged from 320 grammes to 448 grammes. In other words, assuming that we closed the jaws with a force equal to that of 100 grammes at the incisor teeth, it would require the exercise of a muscular effort equal to from 320 to 448 grammes. And if, for the time being, we neglect the influence exerted by the other elevators of the jaw, we may regard this as some index of the development of the temporal muscles. Such being admitted it must also be obvious that a corresponding force will be exerted over the area from which the muscle arises. If this be the case we would naturally expect a correlation between the weights noted and the cranial form, assuming of course that we are prepared to admit that the shape of the head can be affected by any such influences. Happily for my argument, we find this view abundantly supported, for whilst the brachycephalic skulls average a weight of 370 grammes to balance their jaws loaded to the extent of 100 grammes, we find the dolichocephalic skulls require a weight of 390 grammes to produce a like result under like conditions, that is to say, a difference of over 5 per cent. in the amount of force necessary to produce the same effect in the two types. Now when one considers what a great amount of force a healthy man is able to exert

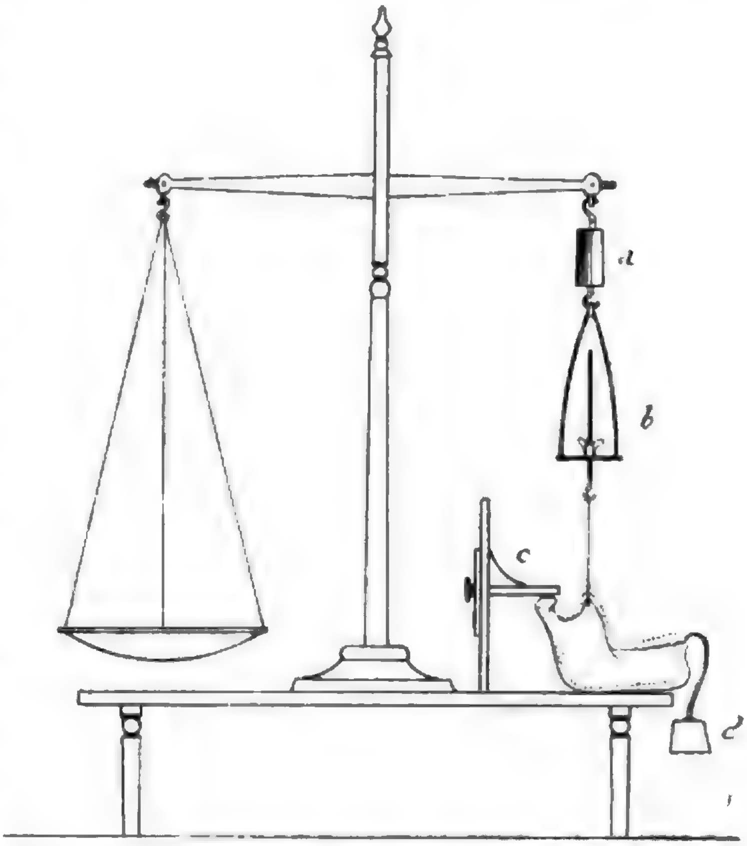

Fig. 3 illustrates the apparatus employed to estimate the amount of force necessary to employ to overcome the resistance of 100 grammes "at the bite." (*a*) Weight to act as a counterpoise to the opposite arm of the balance. (*b*) An arrangement to shorten or lengthen the armature so as to bring the indicator of the balance to zero. (*c*) A ledge affixed to a vertical board which may be raised or lowered so as to rest lightly on the upper surface of the condyles. (*d*) A weight of 100 grammes suspended from the incisor margin of the mandible. The dotted line indicates the position of the jaw when a sufficient weight has been placed in the pan of the scale to overcome the resistance of the jaw loaded with the weight.

on the incisor teeth in closing the jaws, it will be at once realized that the amount of effort necessary to produce this result will vary very largely in the two types: in other words, that the dolichocephals are as a rule furnished with much more powerful temporal muscles than the brachycephals, and, further, since we have already shown that the mandible of the long-headed races is more projecting than that of the round heads, we are justified in assuming that this increased musculature is necessary to overcome the mechanical disadvantage at which so long a lever acts.

If we compare the mandibular index (that is, the projection of the jaw relative to its width) with the weights necessary to overcome the same resistance, we find this conclusion generally supported, for taking the median in the range of the mandibular index as lying between 88 and 89, we find 22 jaws with an index below 89 required an average of 368 grammes to effect the counterpoise, whilst 22 specimens above and including the index 89 required a weight on an average equal to 338 grammes: in other words the shorter jaws required a lesser force to produce the same result as compared with that which necessitated the employment of a greater force in the longer jaws.

The correlation of the coronoid index with the weights recorded display equally striking results. If the median of the range of the index be taken between 38 and 37, it will be found that the higher indices yield an average of 347 grammes as contrasted with 408 grammes, the average weight required by the lower indices. Expressed in a different way, this amounts to saying that the jaw in which the force in applied at a greater distance from the fulcrum, requires a less muscular effort to produce a similar result than is the case in one in which the force is applied nearer the fulcrum.

The influences to which the varieties of cranial form, other than those which we have just considered have been ascribed, are so numerous that we can afford but a passing reference to the more important of them. Amongst those who deny that environment has any modifying effect on head form is Mr. W. Z. Ripley.[1] After what we have already stated in the present communication, we consider that this view is untenable in spite of the "volumes of evidence" which we are told may be adduced against it.

Welcher[2] was the first to associate head form with stature, his assumption being that tall men incline to dolichocephaly, while short men tend to be brachycephalic. Schaafhausen[3] implies support to this view by a reference to the height of the gorilla and its pronounced dolichocephaly. Darwin[4] expressed the opinion that it was possible that increased bodily stature with no corresponding increase in the size of the brain may have given to some races an elongated skull of the dolichocephalic type; this conclusion is evidently based upon his

[1] *Races of Europe*, London, 1900, pp. 52 and 53.

[2] *Untersuchungen ueber Wachstum und Bau des Menschl-Schädels*, Leipzig, 1862.

[3] *Anthropological Review*, vol. vi, 1868.

[4] *Descent of Man*, 1871, p. 247.

observations on rabbits.[1] "Some kinds of which," he says, "have become very much larger than the wild animal, whilst others have retained nearly the same size, but in both the brain has been reduced relatively to the size of the body. Now I was very much surprised to find that in all these rabbits, the skull had become elongated or dolichocephalic." Manouvrier[2] in his classical memoir clearly proves that the growth of the mass of the body is a cause of the increase of the absolute weight, and a diminution of the relative weight of the brain; he further points out that the young have an encephalic weight relatively high, (1) because they are already in possession of the embryonic nervous elements which are developed later, and (2) because they are small. In addition, he states that small people have a relatively greater brain weight, because the number, variety and complexity of sensations, of ideas and of movement are independent of the mass of the organism. Welcher's views have not been allowed to pass unchallenged, since there are apparently so many obvious exceptions to the rule. Daffner[3] calls in question so general a conclusion, and prefers to explain brachycephaly on the general rule that increase takes place rather in breadth than length, as exemplified in the case of muscles, and the thoracic framework; thus, by the application of this principle to the growth of the brain, he accounts for the broadening of the skull. Aeby[4] too laid great stress on this increase of breadth, and states that the normal skulls of all races agree with one another as regards the median plane, and that in this respect the extremest dolichocephaly and brachycephaly show no difference whatever, an assertion which has since been to some extent disproved by the researches of Huxley[5] and Cleland.[6]

Among other explanations of the varieties of head form, are some which can hardly be regarded as explanations at all.

Macnamara[7] explains the progressive development of the *skull* as having resulted from: (*a*) The innate capacity of the human skull to allow of the growth and specialisation of the cerebral nervous system, especially in its anterior and frontal region. (*b*) The cross breeding of different races. (*c*) The long continued effect of geographical and atmospheric conditions, and the struggle for existence. Unfortunately in the summary from which those conclusions are quoted, the evidence on which they are based is not included.

Professor Macalister[8] considers that brachycephaly, as in the Negritoes, is due to a survival of the infantile condition, or in the Teutonic Europeans, to a secondary increase in the width of the hinder part of the frontal cerebral lobes. Dolichocephaly may be due to an increased length of the frontal and parietal areas of the brain indicated by increased preauricular length, or to a diminution of the parietal width and increased occipital length, thereby suggesting that the cranial shape is due to the form of the brain rather than to its volume. Here it may be worthy of note, that as a rule the shape of organs have little to do with the form of the cavities in which they are lodged. So far as we are aware, the shape of the eyeball is not correlated with the form of the orbit. Its presence in bulk is a determining factor, as proved by the experiments of Dr. Ernest Thomson,[1] who removed the eyeball on one side in young rabbits, and found that there was a consequent atrophy of the orbit on the same side. Nor can we regard the form of man's thorax as due to the *shape* of the lungs. It is a consequence of the assumption of the bipedal posture, associated with the relief of the upper limb for prehensile purposes, and what modifications in form are due to the thoracic contents are those which depend on an increase or diminution of their volume, and not on alterations of their shape.

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[1] *Variations of Animals*, vol. i, p. 117.

[2] "De la quantité dans l'encéphale." *Mémoires de la Soc. d'Anth. de Paris*, 2e ser., tome iii.

[3] *Das Wachstum des Menschen*, Leipzig, 1902.

[4] Quoted from Schaafhausen.

[5] *Journ. Anat. and Phys.*, 1866, p. 60.

[6] *Phil. Trans.*, 1869.

[7] "Hunterian Oration," 1901. *Brit. Med. Journ.*, Feb. 23, 1901.

[8] *Encycl. Britannica*, vol. xxv. Supplement. Article "Anatomy."

The law of compensation first enunciated by Virchow[2] has an important bearing on the growth of the cranium. As that distinguished anatomist has shown, among skulls belonging to the same type a breadth above the average is compensated for by a height and length below the average. This is also associated with a difference in the activity of the growth along the line of the cranial sutures, as exemplified in the types of form described as Scaphocephalic, Thyrsocephalic and Trigonocephalic, where each variety is associated with premature synostosis of the Sagittal, Coronal, and Mid-frontal sutures respectively. But this principle of compensation seems to act independently of these factors, and appears to be associated also with the poise of the skull upon the summit of the vertebral column.

A prognathous face, as has already been pointed out, is usually correlated with an extension backwards in the occipital region, in this way the proper balance of the head is preserved, and the least amount of muscular energy is required to maintain it in position. Shute[3] accounts for the modifications in head form which are characteristic of racial types on the general proposition that the face is decreasing in size with early closure of the sutures, while the cranium is increasing in size with late closure of the sutures.

Relating to the question of sutures, we must bear in mind that the manner of ossification of the bones of the cranial base differs from that of the vault and sides; whereas the former develop in cartilage, the latter ossify in membrane. A general survey of craniometrical measurements seems to show that there is less deviation from the type in the moulding of the cranial base than of the membranous vault, and such changes as lead to the expansion of the latter react far less than one might expect on the basal region. That such changes do occur is, however, abundantly proved. In order to test this, I took two skulls of equal capacity

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[1] *Trans. Ophthal. Soc.*, vol. xxi, 1901, p. 258.

[2] *Ueber den Cretinismus, etc., Gesammelte Abhandlungen, Frankfurt*, 1856. Quoted from Topinard, *Eléments d'Anthropologie Général*, 1885, p. 731.

[3] *American Anthropologist*, vol. ix, p. 123.

MEASUREMENTS OF A BRACHYCEPHALIC AND A DOLICHOCEPHALIC SKULL OF EQUAL CAPACITY BEFORE AND AFTER DISARTICULATION.

Measurements of the Skulls prior to Disarticulation.

	Brachy-cephalic skull.	Dolicho-cephalic skull.		Brachy-cephalic skull.	Dolicho-cephalic skull.
Cubic capacity	1,180	1,180	**Cephalic Index**	86·1	72·2
Glabello-occipital length	159	173	Horizontal circumference	447	484
Ophryo-occipital length	159	174	Frontal longitudinal arc	108	121
Naso-occipital length	156	170	Parietal longitudinal arc	122	130
Basi-bregmatic height	129	128	Occipital longitudinal arc	97	104
Vertical Index	81·1	73·5	Total longitudinal arc	327	355
Minimum frontal diameter	90	87	Length of foramen magnum	35	34
Stephanic diameter	107	99	Basi-nasal length	97	98
Asterionic diameter	108	96	Basi-alveolar length	98	—
Greatest breadth	137	125			

Measurements of the Bones of the same Skulls after Disarticulation.

	Brachycephalic skull.	Dolichocephalic skull.
BASAL BONES.		
Occipital bone—	mm.	mm.
Basi-occipital length	29	25
Basion to opisthion	32	32
Opisthion to inion	43	40
Opisthion to lambda	97	104
Width between extremes of jugular processes	80	78
Greatest width across occipital squama	122	118
Sphenoid—		
Length of body from middle of basi-sphenoidal suture to middle of ethmo-sphenoidal suture	30	35
Width between summits of great wings	107	96
Width between sphenoidal spines	60	56
Width between tips of anterior clinoid processes	27	defective.
Ethmoid—		mm.
Length from midpoint of ethmo-sphenoidal suture to anterior edge of cresta galli at foramen cæcum	29	28
Width between ossa plana	27	23
Temporal—		
Maximum length	84	83
Length of petrous, from summit to inferior edges of external auditory meatus	45	43
Height from stylo-mastoid foramen to summit of squamosal suture	63	63
COVERING BONES.		
Frontal—		
Frontal arc	108	121
Greatest transverse arc	148	165
Greatest transverse diameter between edges of the bone	109	98
Width between external borders of external angular processes	99	91
Height from level of ethmoidal recess to bregma	88	90
Parietal—		
Length of sagittal border (taken along the bone)	122	130
Length of inferior border	92	87
Length of anterior border	110	106
Length of posterior border	90	89
Greatest vertical arc	123	120
Greatest vertical diameter	106	96
Greatest horizontal longitudinal arc	120	136
Greatest horizontal diameter	112	122

(1180 cc.) and of markedly different form; both were skulls in which the sutures were still open, presumably from individuals about eighteen to twenty years of age. The one exhibited pronounced dolichocephaly with a cephalic index of 72. The other was brachycephalic with an index of 86. After careful measurement, of which the record is given herewith, the skulls were then disarticulated and the individual bones examined. A list of the principal measurements is subjoined, from which it appears that whilst the measures in length of the basal bones vary slightly, yet the sum of their lengths displays little difference, the excess being in favour of the brachycephalic skull. As regards the measures of width of the basal bones, we recognize a distinct difference, the lesser diameters being associated with the dolichocephalic skull. When we pass to examine the proportions of the bones which constitute the sides and vault of the cranium, such as the length and breadth of the occipital squama, the width between the sphenoidal wings, and the diameters of the ascending plate of the frontal bone, we note considerable variation; whilst the measurements in length of the parietal bones display a marked difference.

These facts, therefore, appear to support the contention of Aeby, that the length of the cranial base is the most stable of the measurements of the skull.

There are one or two further points in regard to the sutures to which reference may be made. Brinton[1] asserts that there is a distinct correlation between prognathism, dolichocephaly, and early synostosis of the sagittal suture; the latter result he attributes to the action of the temporals in producing a bi-lateral compression of the head, thus developing an opposed increased synostotic activity along the median line. This is a view we cannot accept as proved, until further evidence is forthcoming, though, as Professor Cope has pointed out in his discussion on Dr. Brinton's paper, it is probably the reason why early synostosis of the sagittal suture is a universal character of the apes. But the question may be asked, is there any evidence that the sagittal suture alone displays this synostotic activity? Welcher remarked on the early closing of the sutures generally in savages and animals, and Pritchard and Pruner Bey confirmed this observation as regards negroes.

The anomalous condition in which the mid-frontal suture persists has been the subject of much research. More than thirty years ago Welcher showed that the metopic suture occurred more frequently in brachycephalic than in dolichocephalic crania, an observation which has since been confirmed by Dr. G. Papillault.[2] The latter, however, points out that this condition is due to a superiority in the bulk and relative weight of the cerebrum, a condition not necessarily associated with higher intellectual attainments. Another region in which we meet with divers arrangements of the sutures is the pterion. As the side of the cranium forms the floor of the temporal fossa, five sutures enter into its composition, viz., the parieto-squamosal, the parieto-sphenoidal, the frontoparietal, the fronto-sphenoidal, and the spheno-squamosal. The arrangement of these sutures at the pterion is either disposed in the form of an H or an X, and in some anomalous cases in man there is a condition in which the frontal and squamosal articulate, thus separating the parietal from the sphenoid. Much attention has been directed to the arrangement of the sutures in this region, the paper of Anoutchine[1] being perhaps the best known. I have also studied this region in considerable detail (over 1,000 skulls), and my observations lead me to the conclusion that the pterion in H is the concomitant of skulls of a brachycephalic type, whilst the pterion in X is associated with dolichocephaly.

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[1] *American Anthropologist*, vol. vii, p. 382.

[2] *Memoires de la Soc. d'Anth. de Paris*, tome ii, 3 série, 1er fas.

The upward curve of the squamosal is also a more pronounced feature in short than in long skulls. But whilst undoubtedly the disposition and mode of union of the sutures exercise a certain influence on cranial form, by far the most important factor is the increase in the cranial capacity rendered necessary by the increase in the volume of its contents.

The doctrine of Gall that the form of the cranium (see Topinard, p. 648) is always the consequence of the shape of the brain is now so universally discredited that I need not waste time in discussing it here. Apart from the question of the contours of the brain, however, we have to consider its bulk, and this must obviously react on the capacity of the envelope in which it is contained, but not only does it react on the capacity of the envelope, it also leads to *material modifications in its shape.* Given a cavity of oval or elliptical form with elastic walls, the more its contents are increased the greater will be its tendency to assume a spherical shape. A reduction in the amount of its contents will naturally allow it to return to its primitive condition. Assuming, and all the evidence is in favour of such an assumption, that man is descended from a type in which the cranial capacity was much lower than in even the lowest of existing races, it follows that the modification in shape consequent on an increase in the bulk of the encephalon will tend toward sphericity, in other words the cranium will become rounder. The whole evidence at our disposal goes to prove that primitive man had a calvaria of elongated form and low capacity, and, other things being equal, it may be considered as certain that increase in the bulk of the contents of such a calvaria will lead to increase in size accompanied by a more rounded form.

The rate at which these changes take place, however, is so slow as to obscure the nature of the alteration which these variations in the bulk of the contents produce. It becomes, therefore, a matter of much importance to see whether there are any observations in which the records of such changes may be readily studied in a race with more or less fixed characteristics. For this reason we are justified in taking cognizance of such extremes as are met with in microcephaly and hydrocephaly. From the time of Blumenbach, the study of microcephaly has engaged the attention of men of such repute as Vogt, Bischoff, Aeby, Marchand and Giacomini. In most instances, these investigators have concerned themselves with speculative explanations regarding the etiology of this condition. With this aspect of the case, however, we are not concerned. All that it is necessary for us to consider is the change in form displayed by the skull, consequent on the reduction in bulk of the cranial contents. Cunningham in a recent paper[1] was able, not only to examine the brain of a microcephalic idiot, but was also fortunate in having the opportunity of fully describing the skull of the same individual. He was able to preclude the influence of the premature synostosis of certain of the sutures as a determining agent, for in the skull he examined they were not united to a greater extent than in a person of corresponding age.

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[1] "Des Anomalies du ptérion." *Rev. d'Anthr.*, 1882.

It was, however, unfortunate that the specimen he examined was incomplete, for the mandible was wanting, and portions of the alveolar margin of the superior maxilla were also absent. Nevertheless there was ample evidence of the influence of the masticatory apparatus on the cranial form, for the temporal ridges are described as rising on either side to within 22 mm. of the sagittal suture, a very common feature in the microcephalic skull, and one which has already been emphasized by Vogt. As Cunningham says, there is every reason to believe that the early progenitors of man, who undoubtedly possessed a smaller cranium and probably a larger face (?) than modern man, displayed a somewhat similar condition of the temporal ridges. This much we may say, he continues, without insisting that the character, as it is exhibited in the microcephal, is to be regarded as atavistic.

Another matter of importance elucidated by the distinguished Edinburgh Professor is the fact that notwithstanding the enormous diminution in the capacity of the microcephalic cranium, the base has suffered no reduction, for comparing it with the basi-cranial axis of an Irish and a negro skull, the measurements were found to be 65 mm., 64 mm. and 66 mm. in each respectively. The difference, therefore, was confined to the cranial vault, which exhibited in the microcephalic idiot a reduced capacity of 620 cc. together with a pronounced degree of dolichocephaly. The maximum length measured from glabella to inion was 156 mm., whilst the greatest breadth situate at the level of the mastoids was 112 mm., yielding a cephalic index of 71·7. The altitudinal index is given as 71·2. The orbital openings are described as somewhat square, though megaseme, whilst the glabella was stated to be exceedingly prominent, though the superciliary ridges were poorly developed. The pithecoid appearance of the occipital region is pronounced, owing to the maximum antero-posterior diameter coinciding with the external occipital protuberance, still futher emphasized by high and massive curved lines and by the slight degree of basal inclination of the nuchal surface of the occipital bone. Here then, apart from the possible influence of atavism, we have a low and almost pithecoid type of skull resulting from the occurrence of an ill-filled and poorly developed cranial chamber.

Let us look now to the appearances exhibited in skulls which have been subjected to the influence of increased internal volume, as displayed in cases of acute and chronic hydrocephaly. An examination of three infantile hydrocephalic skulls furnished the following results:—

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[1] *The Scientific Transactions of the Royal Dublin Society*, vol. v, Series ii.

Cat. number.	Basi-nasal length.	Maximum length.	Bi-auric width.	Greatest width.
241	64 mm.	158 mm.	67 mm.	134 mm.
?	63 ,,	165 ,,	62 ,,	108 ,,
239	62 ,,	182 ,,	67 ,,	137 ,,

If these measurements be compared with those taken from normal infants of about the same age, it will be found that there is little disparity between the basi-nasal and bi-aurical diameters of the diseased and healthy skulls.

I find this view supported by the examination of an adult skull of the chronic hydrocephalic type. In this specimen, in which both lower wisdom molars were *in situ* and the upper left 3rd molar was cutting, the measurements were as follows:—

Cat. number.	Circumference.	Basi-nasal.	Maximum length.	Bi-auric.	Greatest width.
(238)	650 mm. (25½ in.)	99 mm.	214 mm.	117 mm.	182 mm.

Here again, the basi-nasal and bi-aurical diameters correspond closely to the measurements met with in the normal skull. These observations appear to me to prove that, just as in the case of the microcephalic skull, the base of the cranium suffers but slightly from disturbances which affect the capacity of the overlying chamber. This fact seems to me of importance, since it appears to prove that we must correlate the measurements of the cranial base not with alterations in the capacity of the skull, but rather with the bulk and height of the bodily figure.

Admitting, as is reasonable, that the expansion of the vault will take place in the direction of least resistance, viz., at right angles to the line of the sutures, and in the vicinity of the fontanelles, we have a ready explanation of the characteristic form imparted to the skull. The parietal, of all the other bones of the vault, seem to be the most readily affected, for we find they increase in all its diameters. But the effect on the frontal region is noteworthy, particularly as it supplies us with an explanation of the features in that bone which are characteristic of certain ethnic groups. Owing to the development of the frontal bone in lateral halves, its power of lateral expansion is amplified by twice what it would otherwise be, were its growth confined to its lateral borders. In hydrocephalic skulls where there is an excess of this expansion, we see clearly that the effect produced is the thinning and upward elevation of the supra-orbital margin, imparting to the orbits a circular form. This is most noticeable in the infantile skulls, though it is also apparent in the adult skull in the Oxford Pathological Museum in marked contrast to what is described by Cunningham in the case of the microcephal, where the shape is quadrangular.

It is an interesting fact that in one of the seven skulls figured by Humphrey in his paper on microcephalic skulls, there is an example of the pterion in K whilst in the Oxford macrocephalic adult the spheno-parietal suture measures 25 mm. in length. We are, I think, therefore justified in assuming that with increased capacity the spheno-parietal suture tends to increase in length whilst with diminished capacity it undergoes a reduction in length. In this respect, harmonizing with what we find in apes where the pterion in H is characteristic of these forms with a high proportional capacity, whilst the pterion in X and the "ptérion retourné" of Broca, in which the frontal articulates with the squamous temporal, is met with in the gorilla and semnopithecus.

The conclusions to be deduced from this study of microcephalic and macrocephalic types has been well summarized by Humphrey,[1] who wrote (p. 325): "In the microcephalic, the brain case is small or contracted in all its dimensions, in the base as well, though less than in the vault, and it is most so in the fore part; the frontal bone being sloped back and narrow with deep temporal fossæ behind the external angular processes, and with curved orbital plates which narrow the ethmoidal fossæ. The parts in the interior are contracted and often thickened. The occipital condyles are rendered prominent by the sloping of the squamous and basilar parts of the bone behind and in front. The superciliary ridges are thrown into prominence, and the frontal sinuses are large. The facial bones, smaller than normal, and less wide with a narrower dental arch, though proportionately large, are prognathous, the upper incisive alveolar processes and teeth being especially so. The angle of the lower jaw is more open than usual. The foramina at the base are usually small. In the macrocephalic, all this is reversed. The brain case is expanded in all directions, to some extent in the base, but much less than in the vault. The forehead bulges forward, beetling over the face; the orbital plates are in the round flattened and pressed down, and the superciliary ridges are elevated and suppressed. The temporal fossæ are shallowed, and the occipital condyles are not prominent. The face, though in many larger than ordinary and widened, the dental arcade being wide, and the rami of the maxilla being slanted outward to accommodate the condyles to the separated position of the glenoid fossæ, is relatively small, retired beneath the forehead and devoid of prognathism."

With most of the above I cordially agree, though I am inclined to think that Sir George Humphrey exaggerated the influence which these conditions exert on the cranial base. His conclusions are not supported by measurements, and my observations lead me to think, and in this they are confirmed in the case of the microcephal by Cunningham, that the changes produced in the disposition of the base is less than might at first be supposed. I am of course quite prepared to admit the splay of the portions of the basal bones which enter into the formation of the lateral walls of the cranium, but the evidence at my disposal does not permit me to assent to some of his more general statements. In this I am confirmed by the observations of Styles,[1] who says the expansion of the lesser wings of the sphenoid assist materially in enlarging the anterior fossa, but "the basi-sphenoid and basi-occiput remain much about their normal size, as also do the petrous-temporals, which appear, therefore, relatively to the other bones to be unduly small." The same observer draws attention to the fact that "although the face looks so diminutive when contrasted with the cranium, it is in reality broader than normal. This is due not only to the expansion of the frontal bone but also to the broadening of the ethmoid, which increases the distance between the eyeballs."

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[1] "Notes on Microcephalic and Macrocephalic Skulls." *Journal of Anat. and Phys.*, vol. xxix, p. 304.

From a consideration of the foregoing observations, it must be apparent how great an influence the expansion of the cranial envelope plays in the determination of the shape of the calvaria. We are indebted to Professor Boas[2] for having made this clear. In an extremely interesting paper on the cephalic index, this author has succeeded in establishing certain correlations which are of great value. Thus he shows that the diameters of the skull are primarily determined by its capacity, the height appears to be most closely associated with the capacity, the length least so. On the other hand, the correlation between the breadth of the face and the horizontal diameters of the head shows the two transversal diameters to be very closely correlated, while the length of the head is more closely correlated with the height of the face. Boas further notes that when capacity is introduced in our consideration of the question, a compensatory growth is found to exist between the breadth of the head on the one hand, and height and length on the other. He further proceeds to add, that the correlation between length and breadth is not the expression of a biological relation between the two measurements, but an effect of the change which both undergo when the capacity of the skull increases or decreases. The cephalic index, therefore, is not the expression of a law of direct relation between the length and the breadth of the skull. The proportion between the diameters of the skull and its capacity, on the other hand expresses an intimate biological relation between these measurements. "It appears that the diameters of the head must be considered as due to the tendency of the inner cavity of the skull and *more probably of the brain*, to assume a certain size and form in a given type of man, this form being expressed by the proportion of the diameters of the brain and its size. If one of the diameters differs from the normal, in being excessively large, the other will tend to be too small. From these considerations it follows that while the cephalic index is a convenient practical expression of the form of the head, it does not express any *important anatomical* relation. On the other hand, the relation between capacity and head diameters is found to be of fundamental importance, and among these the relation between transversal diameter and capacity is most significant." I have quoted Professor Boas at some length, because it seems to me most of his conclusions are justified by the facts, the only detail on which I would venture to differ from him being his suggestion that the *form* of the brain, as distinct from its size, has anything to do with cranial shape. It is interesting in this connection to note that Daffner[1] holds that the cephalic index is to be regarded rather as an anatomical than an ethnological characteristic.

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[1] "A Contribution to the Morbid Anatomy and Pathogenesis of Chronic Internal Hydrocephalus." *Edinburgh Hospital Reports*, vol. iv.

[2] "The Cephalic Index," *American Anthropologist*, N.S., vol. i. 1899, p. 448.

When we look for confirmation of these views with regard to the development of the head shape, during normal growth, we are faced with evidence of a conflicting nature. It is difficult of course in so complex a problem, where so many different factors may be concerned, to arrive at anything like definite conclusions, without much more information than we already possess.

In the anthropoids, as we have seen, the cranial form of the young ape is much rounder than that of the adult. In these animals the growth of the calvaria is dominated by the powerful mandible and its associated muscles, while the cranial expansion is relatively small. In man this process is complicated by the interaction of a masticatory apparatus gradually undergoing reduction, and an expansion of the cranial cavity steadily increasing, and it seems probable that the resulting form must depend on the extent to which these interacting agencies exercise their influence. In this way we have an explanation of the differences which are recorded in the head growth of certain races.

That there is a difference in the head form of children at birth seems pretty well assured. Galabin[2] states that "difficult labours are perceptibly more numerous in a race like the Teutonic, in which the type of head is short and round, than in one like the Celtic, Scandinavian, or Norman, in which it is more frequently long or dolichocephalic," but the correctness of this assumption cannot be admitted without having fully considered the influence of the form of the maternal pelvis. Blumenbach[3] considered that the Negroid and Mongoloid characteristics were observable in the infantile skull. Touchard[4] asserts that there is no way of distinguishing the negro from the white infant except by its colour. On the other hand Sergi[5] has proved conclusively that there is a great variety of shape displayed by the fœtal skull, and it is probable that these differences have escaped the notice of observers like Pruner Bey and Aeby, who have denied their existence. It must be admitted, however, that the form displayed by a dried fœtal skull is not necessarily that of the living, since in the process of dessication, the membranous and partly ossified layers shrink differently. My own experience, based, it is true, on a limited number of observations, leads me to distrust the accuracy of the detailed deductions drawn from such specimens, though I am willing to admit that this criticism does not invalidate the general conclusion that the infantile skull may and does display extreme diversity of form. The matter, however, is one which might well be inquired into, provided fresh and properly preserved skulls could be obtained.

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[1] *Wachstum des Menschen*, Leipzig, 1902, p. 306.

[2] *Manual of Midwifery*, 1900, p. 95.

[3] Decas, III Coll., etc., No. 29, 30.

[4] "Développement Comparé de la Face." *Bull. Soc. d'Anth. de Paris*, 1866.

[5] "Le forme del cranio umano nello sviluppo fetale in relazione alle forme adulte." *Revista di Scienze Biologiche*, vol. ii, n. 6-7 and n. 11-12.

Ales Hrdlicka,[1] though he does not precisely refer to the infantile skull yet deals with children at an early age, and expresses the definite opinion that the form of the head is less variable in the coloured children than it is in American-born white children; the former almost always display pronounced dolichocephaly, whilst the latter show every variation from a markedly long head to pronounced brachycephaly.

Daffner[2] considers the typical form of the skull of the new-born child as long and orthognathous.

In the growth of the cranium, subsequent to birth, the evidence forthcoming is equally conflicting.

Daffner[3] says that the higher cephalic index displayed by the adult as compared with the new-born child leads us to believe that brachycephaly is the attribute of the higher race, dolichocephaly that of the lower race. He supports his conclusion by the subjoined figures.

	Males.	Females.
Newborn. Cephalic index	78·5	79·6
25 years of age. Cephalic index	82·6	84·4

His data for the new-born children are taken from Hecker whilst the measurements of the adults are his own. There is no evidence to show that the material chosen was selected from the same locality.

Schaafhausen[4] from observations on his own children concludes that the length is attained sooner than the breadth. The length reaches its maximum about the age of twelve or fourteen, but the head continues to increase in breadth thereafter. He accounts for this by saying that the leguth is correlated with the length of the vertebral column, because the base of the skull is to be considered as its prolongation, whilst the breadth increases with the intellectual development.

Graf Spee[5] states that throughout the post embryonal period of growth, the height and length of the skull grow, on the whole, faster than the breadth.

Boas[6] maintains that when the breadth of the head and stature are compared, it is shown that after the fifth year of life, the rate of increase of the former is very slight.

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[1] "Anthropological Investigations on 1,000 White and Coloured Children of Both Sexes." *New York and American Anthropologist*, vol. xi.

[2] *Wachstum des Menschen*, Leipzig, 1902.

[3] *Loc. cit.*

[4] *Bull. Soc. d'Anth. de Paris*, 1866, 11e Sér., vol. i, p. 319.

[5] *Bardeleben's Handbuch der Anatomie*, 1896, Band 1, 3 lief, p. 352.

[6] *American Anthropologist*, vol. vii, p. 313.

Gonner's[1] researches seem to show that at birth children appear to be more dolichocephalic than the adults of their race, but from the first month the head grows faster in breadth than in length.

Deniker's[1] own investigations lead him to believe that the heads of children increase at first in breadth, to arrive afterwards gradually at a definite form which is fixed about the age of ten, twelve, or fifteen years, according to race. In opposition to this view, it may be interesting to note that J. Venn[2] has shown that among Cambridge students there seems to be a small but decided increase in the head measurements after the age of nineteen in the case of all the students alike.

Merkel[3] describes the various stages of post-embryonal growth as follows: The first year is characterized by universal growth; during the second to the fifth year, there is increase in the transverse width of the frontal region, together with greater prominence in the occipital and parietal regions. From five to seven the base increases sagittally. After puberty the temporal fossæ become more capacious, and the skull increases in breadth. He also explains how a growth in one region may be compensated by an expansion in another direction. On the other hand the tables furnished by Hrdlicka[4] seem to support his contention, "that the increase with age does not take place in all of them in the same way. The maximum antero-posterior diameter increases most, the maximum lateral diameter least with the ages of the children. Thus as the children grow older, their heads become longer and their cephalic indices diminish."

Considering the nature of the evidence before us, it must be admitted that it would be obviously dangerous to draw any deductions from it. I believe the discrepancies have arisen mainly through a lack of appreciation of the mechanical agencies at work, apart altogether from the influence of heredity which is admittedly a potent agency, as demonstrated by the researches of Karl Pearson, and until we can obtain data, based on the examination of the growth of children of different races and of as pure type as is attainable, it seems that we are only complicating the solution of the problem. As I have endeavoured to show, the principal mechanical factors at work in the determination of cranial form are cranial expansion or capacity, jaw development and sutural growth. Until in our observations on the development of cranial form, we take these factors into account and endeavour to determine which is the dominant influence, I fear the inquiry will only lead to further confusion. For I think we have sufficient evidence for assuming that the growth of the head in a race characterized by low cranial capacity and a prognathous face will differ widely from that in which large relative cerebral volume is associated with a diminished mandibular development.

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[1] Quoted from Deniker. *The Races of Men*, 1900, p. 74.

[2] "Cambridge Anthropometry." *Jour. Anth. Institute*, vol. xviii, 1888, p. 151.

[3] *Henle's Festgabe*, Bonn, 1882, p. 164.

[4] *Anthropological Investigations on 1,000 White and Coloured Children of Both Sexes*, New York.

It occurred to me that it might be possible experimentally to test the influence on the form of the skull of these mechanical agencies, which we have just discussed. At first I thought that by decalcifying a fresh skull, I might be able, by the exercise of pressure on various points, to demonstrate the secondary effects of that force on other parts of the cranium, but the method did not seem to yield any very satisfactory results, and though there are some points it may serve to elucidate, since they are more particularly connected with the face form, I reserve for the time being any further notice of this particular experiment.

After repeated attempts in various directions, I at length had recourse to the following device. It is true it is only a very crude representation of what takes place during life, but it serves to illustrate certain of these processes and in some respects has yielded results far exceeding my expectation.

A skull, preferably one with a lower jaw, was taken, and the whole of the vault and sides of the cranium were removed, by a cut which extended transversely across the glabellar region of the frontal bone, thence on either side in a curved direction across the floor of the temporal fossa to nearly the level of the pterygoid ridge; from this it curved upwards and backwards over the line of the petro-squamosal suture, over the mastoid region, and finally curving gently along the superior occipital line ended at the inion posteriorly. The edges of the cut bone were rounded off and many of the irregularities on the interior of the base were filed away. Into the interior of the cranial base as so exposed, was glued a piece of specially prepared canvas coated on one side with rubber solution, such as is used to repair the covers of the pneumatic tyres of bicycles. This was moulded into the various fossæ of the base, leaving an aperture in the position of the foramen magnum. After the glue was dry, the rubber surface, which was directed upwards, was prepared by repeated coats of rubber solution. A rubber balloon of the larger and stronger sort, such as may be purchased in any toy shop, was then applied to the cement-covered surface of the canvas, the tube through which the balloon is distended, being thrust through the foramen magnum; the skull cap was then replaced and firmly held in position, whilst the balloon was forcibly distended with air through a valve attached to the orifice of the tube outside the foramen magnum. For this purpose, a valve such as is used for bicycle tyres was employed, and air was injected by means of an ordinary bicycle inflator. In this way, the balloon contained within the cranial cavity was forced into the various irregularities of the base, and coming in contact with the cement-covered surface of the canvas adhered thereto. The operation is by no means so easy as might at first appear, and I experienced repeated failures before I got a satisfactory result. When, however, I at last succeeded, I obtained a skull with an air tight elastic capsule firmly cemented to its base, and lying free and capable of expansion after the removal of the bony skull cap. Here then we had an arrangement in some respects simulating the membranous cranial vault, so essential a part of the developing skull.

It became a matter of interest to see what changes took place in the form of this elastic envelope as we increased or diminished the quantity of air within. The results proved particularly instructive. With just such an amount of air within the bladder as was necessary to slightly distend its walls, we obtained a form which was distinctly reminiscent of the anthropoid type. The internal pressure was not yet sufficient to distend the fore part of the cavity, and, in consequence, the brow ridges remained prominent and outstanding, whilst the shape assumed by the vault was that of pronounced dolichocephaly. On increasing the internal pressure by the injection of more air, the frontal region became gradually inflated, with the consequent gradual disappearance of the prominent supra-orbital arches, in fact, as the tension was increased, the form of the envelope altered so as to successively display the contours associated with such types as that of Pithecanthropus, and the skulls of the Neanderthaloid and Australoid races. As yet, however, the remainder of the vault preserved its elongated and narrow form, thus exhibiting in almost every detail the characteristics of the skulls of what may be termed the primitive races of man. On proceeding still further with the inflation of the balloon, the expansion whilst general throughout, particularly affected the height and width of the vault, passing through all the stages of decreasing dolichocephaly, through mesaticephaly, to pronounced brachycephaly. The consequent elevation of the frontal region at length caused the entire obliteration of the projecting brows, and the appearance presented by the model displayed all the features of a skull of an elevated type.

It may be urged that the foregoing experiment proves nothing, and whilst admitting that the means employed are far removed from those concerned in vital processes, yet no one who has seen the model but admits the remarkable resemblances to the forms displayed by the skulls of living and fossil races.

The demonstration of the cause of the production of the supra-orbital ridges, and their subsequent disappearance by the further extension of the cranial cavity was most instructive. I realized for the first time the necessity for the massing of the bone in this region in skulls of small cranial capacity. The cranio-facial axis is as essential to the face as it is to the calvaria; a reduction in the size of the latter does not necessarily reduce the length of that base, since it must serve as the axis from which the ventral skeleton depends. As a consequence, however, of the reduction in the size of the cranial cavity, the bone over the orbital ridges must be thickened in order to afford a base of resistance through the superior maxilla against the bite of the mandible. When, however, the distension of the cranial cavity leads to an expansion of that space over the orbits, and a consequent elevation of the frontal region, the necessity for this heaping up of the bone over the brows disappears, since the orbital and ascending plates of the frontal bone are now disposed at such an angle as to greatly enhance the strength of this part of the skull without entailing as much bony deposit.

The experiment further demonstrated in a most forcible way the gradual transition from the dolichocephalic to the brachycephalic type which accompanies increased cranial expansion. It seems absurd after this exhibition of the influence of internal pressure to discuss the independent origin of the dolichocephalic and brachycephalic types. Everything points to the dolichocephalic as being the older stock, and though it may have taken many thousands of years to have evolved the rounder headed races from it, we have only to consider the evidence already adduced in connection with hydrocephalic skulls, and the facts observed in the above experiment, to realise how readily this transformation may occur and how intimately it is associated with increased internal capacity. As will be noticed hereafter there are other agencies at work, but at present we are not taking any of these into account.

Hitherto the experiments have been made without any additions being made to the elastic capsule. It suggested itself, however, that the vital processes might be further imitated by thickening here and there the walls of the balloon so as to simulate the centres of ossification and the line of the sutures. A little reflection, however, will make it clear that this is well nigh impossible. The prominences on a fœtal skull overlying the centres of ossification would require to be copied in the rubber balloon not by a thickening of its walls but by a corresponding thinning, and whilst this may be possibly arranged I have not yet succeeded in getting any satisfactory results.

In the matter of the sutures, however, the problem seems simpler. By cementing to the surface of the balloon strips of thicker rubber about ¼ of an inch wide in correspondence with the lines of the sutures of the vault, we can of course exercise a restraining influence on the expansion of the capsule in certain directions whilst facilitating its distension along other lines. I have not had time yet to pursue this line of inquiry, and the results which I have already obtained are insufficient to draw any conclusions from.

The question next arose whether it would be possible to simulate in any way the influence exercised by the temporal muscles on the cranial vault. As has already been stated (see p. 147), there seems undoubted evidence that there is a distinct correlation between the development of these muscles and the shape of the head.

The only way in which it appeared that this could be done experimentally, was by affixing to the sides of the elastic capsule strands of floss silk such as is used in embroidery. These were disposed in accordance with the arrangement of the fibres of the temporal muscles. Traction by means of weights was then exercised on these silken cords, and in this way the strain and compression exercised by the muscles was to some extent imitated. Here again I am anxious to avoid laying too much stress on the results obtained by so crude an imitation of Nature's method, yet it is remarkable how clearly in some respects the influence of the muscles is demonstrated. The effects are best studied in a model so prepared, first recording the form of the vault after distension with a certain amount of air, and then noticing the change in form produced by applying weights of varying amount so disposed as to represent the force exercised by the muscle when more or less powerfully contracted or when developed to a greater or less extent.

The results obtained show that there is a distinct compression with a compensatory elongation when the fibres are strained by being weighted. This is just what we would expect from a consideration of the facts already elicited in our discussion of this point. The tension on the imitation muscles is also accompanied by a depression of the vertex, but whether or no this is a change which occurs in Nature, I am unable to say as yet from the facts before me.

Another interesting point however arises, viz., the fact that contraction (as represented by the tension on the silken cords) of different parts of the muscle produces different results. An examination of skulls of different types clearly demonstrates the fact that the expansion of the area of attachment of the temporal muscles does not always take place in the same direction. Some tend to rise on the side of the cranium whilst others spread further backward.

There seems reason to believe that the posterior fibres of the muscle are better developed in those who use their jaws in a grinding fashion, and probably this is correlated with the wear of the teeth so characteristic of certain races. No doubt the tough and gritty nature of their diet may be to some extent an explanation of the attrition of the teeth of certain races, but it would also be a direct cause of the more powerful grinding movements necessary to reduce the food to pulp, thereby increasing the bulk of that part of the muscle more particularly concerned in the grinding movement. Be that as it may, the fact remains that when in the model the capsule has been distended so as to assume an ovoid or pentagonoid form, an increased traction of these posterior fibres at once converts the shape into that of an ellipsoid. It has often been pointed out that the Eskimo are remarkable in that, despite their Mongoloid affinities, they yet possess skulls which are markedly dolichocephalic, and which display unusually extensive areas of attachment for the temporal muscles. May this not be an illustration of the dominating effect of these muscles in that race? Since my friend Mr. Balfour, of the Pitt Rivers Museum, tells me that the women especially are constantly employed in their leisure chewing the hide which they use in so many of their crafts, a view which is further supported by the development and expansion of the pterygoid plates in those skulls doubtless associated with a greater use of the pterygoid muscles.

A survey of the foregoing considerations seems to point inevitably to the fact that the volume of the encephalon is the principal determining cause of the shape of the head, thus affording conclusive proof of the soundness of Boas'[1] contention that the breadth and the height of the skull are mainly determined by its capacity. Bearing in mind that the cranio-facial axis is correlated with the length of the vertebral column, of which it may be considered an upward extension, as suggested by Schaaffhausen, we have here an explanation how absolute weight of brain or absolute cranial capacity is no sound criterion of the skull shape. In order to form any estimate of this, the absolute weight of the brain, or the absolute cranial capacity must be correlated either with the height of the trunk or the entire height of the figure. The former height measure is probably the better since it avoids the errors which may possibly arise through the inclusion of the variations in length of the lower limb. Given two races with equal cranial capacity, the one tall the other short, we can readily realize how the taller race with the proportionately longer cranial base will accommodate a brain of equal volume in a calvaria of elongated form, whilst the shorter race, owing to the proportionate reduction in its cranial base, will necessarily require a cranial envelope both higher and wider to enclose the same amount of brain. The classification of races by head form and cranial capacity is at present misleading, unless we also consider the relative proportions of the head to other parts of the body.

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[1] "Evolution, longitudinal et transversal du Crâne." *Bull. Soc. d'Anth. de Paris*, 1866, 11e Sér., vol. i, p. 319

As may be seen from the accompanying figures (Pl. XXIII) the changes induced by the inflation of the bladders gives rise not only to increased breadth, but also marked upward extension of the vertex. This latter is more pronounced than what we commonly find in Nature, and is undoubtedly largely due to the fact that air has been injected into the bladder instead of a fluid having the same specific gravity as that of the brain. I have not yet had time to make experiments in this direction, but it seems probable that the results would more closely resemble the natural forms, since the mass of injected material would by its own weight exercise an influence on the lateral walls of the cranium, and so produce a flatter vertex instead of effecting so marked a distension of the vault as does the method by injection with air. Yet even granting this defect in the present series of experiments, we have ample justification for assuming that the more common types of head form depend almost entirely on the varying volume of the cranial contents.

We have examples of a skull, the elastic envelope of which has been distended so as to display appearances more or less conformable to those varieties described by Sergi under the names ellipsoid, ovoid, beloid and sphenoid, and though doubtless these types are hereditary, yet they simply mean that in the races in which they more constantly occur, the same relative proportion of brain is fairly constant. The specimens, however, affords an excellent proof of how there is no constancy in any one of these types; they merely serve to mark stages in the gradual evolution of a proportionately greater volume of encephalon.

The subtilties of form dependent on the dispositions of ossific centres, of sutural growth, and muscular action are not here represented, but one can readily imagine how each or all of these acting together or in opposition would produce an infinity of forms comparable to these described by the distinguished Italian anthropologist.

There can be little doubt that the pentagonoid forms of skull is largely dependent on the force within being resisted by the denser bone corresponding to the ossific centres. When, however, the internal pressure overcomes this resistance, the bones tend to flatten, and their contours assume a more uniform curve, thus merging into the ovoid or sphenoid types. This change is constantly going on during childhood, and the adult form merely depends on whether the cranial contents have increased sufficiently to obliterate the salient points which overlie the centres from which the bones develop.

It seems to me we are therefore justified in drawing the following practical conclusions. Given two individuals with vertebral columns of equal length and the same volume of brain, the one however possessing a massive jaw, whilst the other displays but a feeble mandibular development, the chances are that the former will be dolichocephalic whilst the latter will be a brachycephal. Again, given two persons of equal vertebral length with jaws of about equal development, we will find that the man possessing the greater volume of brain will have the rounder head. In both these instances I have laid stress on the vertebral length of the individuals being the same, for the men with the long columns have an absolutely longer cranial base than the men with the shorter columns, and when the same volume of brain is packed into the crania of these two types, we find that the degree of sphericity attained in the taller race with the longer base is less than that displayed by the crania of the shorter race with a corresponding shorter cranial base.

No doubt the proportions of the lower limbs are more prone to vary than the length of the vertebral column, and so give rise to differences in height, but the differences in the absolute measurement of the vertebral column must not be overlooked. In a table given by Topinard,[1] the differences between the average absolute measurements of fourteen Polynesians taken from the vii cervical vertebra to the summit of the sacrum exceeds by 10 cms. the corresponding measure in three Negritoes.

In this way, we have an explanation of the observation long ago recorded by Welcher that tall races tend to be dolichocephalic whilst short races are more liable to be brachycephalic.

From what I have said, it will be recognized that the determination of head form depends on the interaction of a variety of factors, that the different shapes met with are the outcome of man's physical and intellectual environment, and that though, through the influence of heredity, they may have developed into racial types, there is not necessarily any stability about them, and that, given the necessary conditions, it is quite possible to evolve a round-headed race from a long-headed race, though undoubtedly in nature the change may have taken many thousands of years to effect.

Description of Plate XXIII.

In the figures a skull is shown, the vault of which has been replaced by an elastic bladder; this has been distended by the injection of varying amounts of air, and the results obtained display not only a change in size, but also an alteration in shape comparable to the forms characteristic of certain types of crania. The *norma frontalis* is represented in Figs. 1; the *norma lateralis* is represented in Figs. 2; the *norma verticalis* is represented in Figs. 3. In each series the appearance of the skull is shown when the bladder is (*a*) slightly, (*b*) moderately, and (*c*) considerably distended.

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[1] *Eléments d'Anthropologie Générale*, p. 1066.

Journal of the Anthropological Institute, Vol. XXXIII, Plate XXIII.

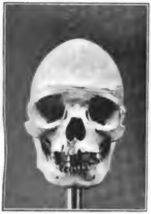


Fig. 1A.

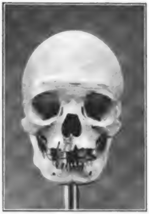


Fig. 1B.

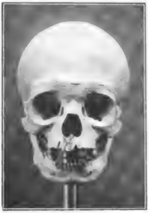


Fig. 1C.

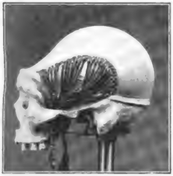


Fig. 2A.

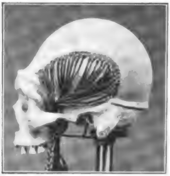


Fig. 2B.

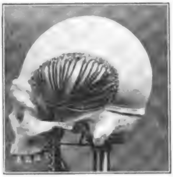


Fig. 2C.

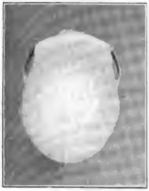


Fig. 3A.

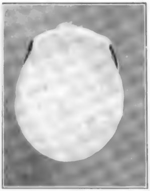


Fig. 3B.

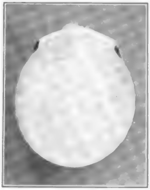


Fig. 3C.

MAN'S CRANIAL FORM.

NOTES ON CHILIAN ANTHROPOLOGY.

By R. T. Latcham, Local Correspondent of the Anthropological Institute for Chile.

Chile, like most South American republics, possesses a very mixed population, the admixture of foreign blood, during the last few generations, being very marked. At the census of 1895, there were nearly 130,000 foreigners, without counting those born in the country of foreign parentage. How then is it possible to study anthropologically a race of so mixed an origin? It would be almost hopeless, were it not that the foreign element flocks to the towns, and the cases of mixture of blood are found principally among the middle and upper classes.

To obviate these difficulties, I have confined my observations to the rural population, and for the most part to the lower classes, in which there is more probability of finding a comparatively unmixed race.

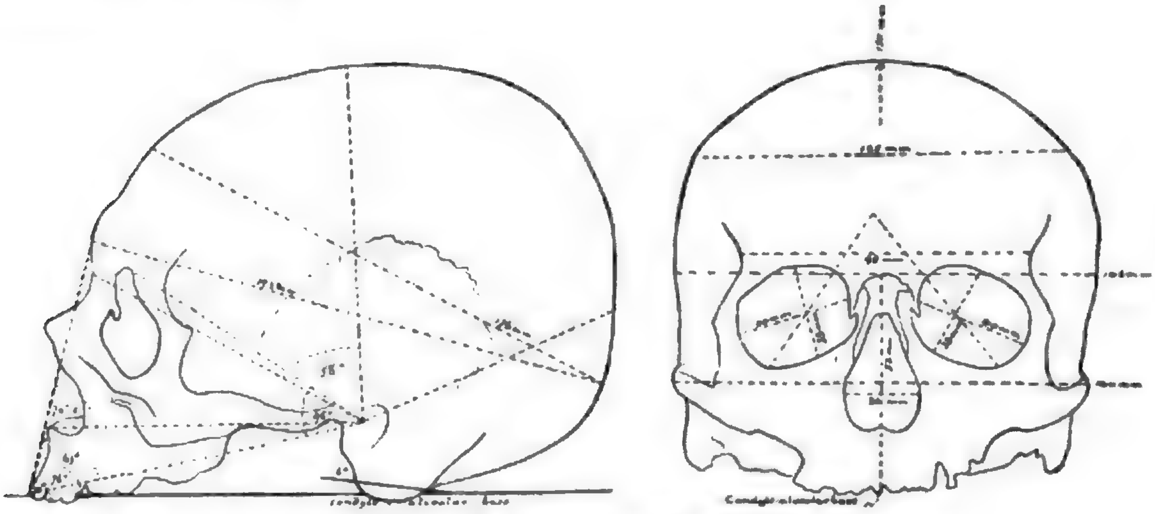
It is a common idea, and one which I must confess I formerly shared, that this portion of the nation was homogeneous and autochthonous in respect of its ethnological type. I have, however, had reasons to doubt this, and now believe that there exist at least two distinct types, differing from each other in many important characteristics. Only one of these at all resembles the aboriginal inhabitants; the origin of the other is doubtful, but possibly it is derived from an Iberian source.

A third type, the most numerous, is clearly a product of the other two; this I have only taken into consideration for the purpose of averages.

Before entering into details, I will just mention the broad physical characteristics of the race as a whole. Considered from a north European standard, it is of low stature, the average height of the men being about 5 feet 5 inches, and that of the women under 5 feet. As a rule, it is rather slightly built, but capable of much physical resistance on a limited diet.

The general colour of the skin is dark, being many shades darker than the darkest European races; and, with few exceptions, black hair and brown eyes are the rule. The hair is straight, abundant, and coarse, but presents variations to which I shall have occasion to refer again. The head is small, especially in the women, so much so, that perfectly normal skulls often seem to be slightly microcephalic. Although this is the general rule, there are exceptions which are quite the contrary, as will be seen. One peculiarity, which I have not seen elsewhere mentioned, and which may give a clue to the ultimate origin of the race, is that the occipital portion of the skull is extraordinarily developed, so much so that the occipital plane lying between the lambda and the inion is generally perpendicular. This gives a flattened appearance to the back of the head, which, instead of having an inward curve at the lower occipital region, as in most races, forms a perpendicular line with the neck, the tendons of which are attached immediately under the occiput. The foramen magnum is not, as might be supposed, placed far back, the skull being well balanced on the spinal column.

Having mentioned that there seem to be two distinct types, I will briefly enumerate the principal differences :—



SKULL OF LARGE-HEADED TYPE.

FIG. 1.—*Norma Lateralis.*

Glabello-occipital diameter	183 mm.
Metopic-occipital diameter	179 „
Facial angle	45°
Frontal angle	58°
Camper's angle	74·5°
Clognet's angle	63°
Prognathism (facial)	76°
Prognathism (sub-nasal)	70°
Foramen magnum....	6°

FIG. 2.—*Norma Facialis.*

Capacity	1,565 cc.
Length	183 mm.
Breadth	146 „
Height	139 „
Zygoma	144 „
Frontal (maximum).... ...	125 „
Frontal (minimum)	98 „
Cephalic index	79·7
Altitudinal	75·9
Orbital	82·5
Nasal	50
Stephanic	78·4

One type is large-headed, big faced, and strongly built, with a medium cranial capacity, broad receding forehead, strongly marked superciliary ridges, and square massive jaw. The other, and more numerous type, is entirely the opposite ; it has a small head, low cranial capacity, narrow face and forehead, and very slightly pronounced superciliary ridges. In build, it is slight and small-boned.

The hair in both types is dark, coarse, and abundant, but in the large-headed type, it is coarser, and of a slightly lighter colour than in the other, and on the body it is scanty and thinly planted. The small-headed type on the other hand is extremely hairy, it being a common thing to see youths of 17 and 18 years with an abundant beard ; this occurs exclusively among this type. The section of the hair in both is nearly circular.

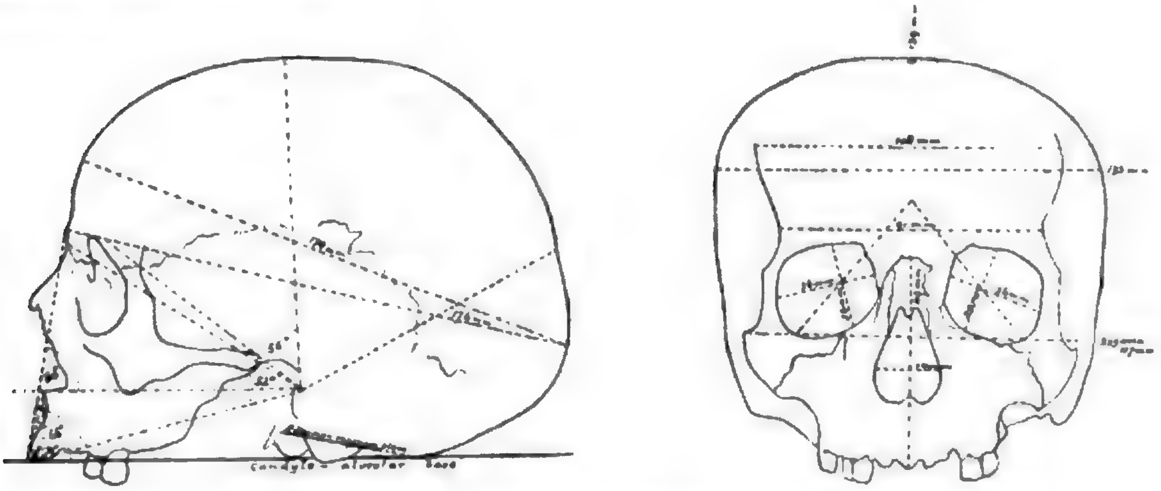
The eyes also in both divisions are dark, varying from light to very dark brown ; but a closer examination discloses that, in the large-headed type, the sclerotic tunic is of a tawny hue, while in the small-headed type, it has generally a bluish tinge. The difference is seen far more readily in the large, flat fleshy noses of the former, and the smaller better formed organ of the latter. This difference is noticeable in many other details, for instance, in the coarse fleshy bodies of the large-head, who incline to corpulency, and the slight small figures of the others, who, on arriving at middle age, become dried up and extremely wrinkled, so as to appear to be much more than their real age. These are points that soon strike even a superficial observer, but in the following measurements they are brought out more clearly.

CRANIOLOGICAL MEASUREMENTS.

Cranial Capacity.—I have already mentioned the small size of the Chilian skull, which will prepare us for the small cranial capacity of this race, although allowance should be made for the measurements having been taken from the lower class of the population.

The methods employed in this and the following measurements are those recommended by M. Paul Broca. In measuring capacity, I used No. 8 shot.

The number of skulls, of which I have been able to obtain the capacity personally, is one hundred and twenty-seven. These gave an average of 1,417 cc.; 1,461 cc. for males, and 1,327 cc. for females. Dr. Luis Solis, who has published a list of measurements of eighty skulls, gives 1,460 cc. for men, and 1,313 cc. for women. The average obtained for the two hundred and one skulls of these two series is thus 1,409·8 cc.



SKULL OF SMALL-HEADED TYPE.

FIG. 3.—*Norma Lateralis.*

Glabello-occipital diameter	176 mm.
Metopic-occipital diameter	179 ,,
Facial angle	52°
Frontal angle	55°
Camper's angle	80°
Clognet's angle	66°
Prognathism (facial)	79°
Prognathism (sub-nasal)	75°
Foramen magnum	12

FIG. 4.—*Norma Facialis.*

Capacity	1,310 cc.
Length	176 mm.
Breadth	133 ,,
Height (basi-bregma)	131 ,,
Zygoma	117 ,,
Frontal (maximum)	108 ,,
Frontal (minimum)	91 ,,
Cephalic index	75·5
Altitudinal index	74·4
Orbital index	83·3
Nasal index	48·9
Stephanic index	84·2

(In this skull the posterior part of the head is 10 mm. wider than the zygomatic diameter.)

On comparing this average with that of other races, we find that it is less than that of the Maoris, of many of the negro tribes, and of most of the South Sea islanders. The women's skulls especially have a very low capacity. Of the eighty-four in the above series, twenty-two had a capacity of less than 1,250 cc. One measured by Dr. Solis, and certified by him to be in a normal condition, had a capacity of only 1,090 cc., or 5 cubic centimetres less than the lowest known to Topinard. The diameters of this skull were as follows:—

Glabello-occipital length	159 mm.
Transverse breadth (maximum)	131 „
Altitude (basion-bregma)	125 „
Frontal breadth (maximum)	102 „
„ „ (minimum)	86 „
Circumference (horizontal)	463 „
„ (vertical and transverse)	464 „

I have one skull in my collection almost as remarkable. It is that of a woman, probably of from 25 to 30 years of age, and has the following measurements:—

Capacity	1,097 cc.
Glabello-occipital diameter	164 mm.
Transverse (maximum)	130 „
Frontal (maximum)	110 „
„ (minimum)	91 „
Altitude (basion-bregma)	121 „
Circumference (horizontal)	474 „
„ (vertical)	457 „

The forehead is very retreating, otherwise the skull is symmetrical, and does not show any indications of microcephaly.

The largest skull I have measured had a capacity of 1,695; the largest in the list of Dr. Solis, 1,660 cc.; both skulls are those of men.

Longitudinal and transverse diameters and Cephalic Index.—The diameters I have used in these measurements, as representing the greatest length of the skulls, is the glabello-occipital line, which, in more than 90 per cent., is the maximum length.

In four hundred and eighty-one skulls, which I have measured in different parts of Chile, the mean average of this diameter was 174·9 mm., the longest being 190 mm., and the shortest 157·5 mm. In the eighty skulls measured by Dr. Solis, the same diameter had an average of 175·2 mm., the longest 193 mm., the shortest 159.

In Chilian craniometry, the maximum transverse diameter is nearly always found in the lower parietal region, close to the squamous edges of the temporals, and sometimes in these latter themselves. The greatest length of this diameter which has come under my notice was one of 159 mm. The antero-posterior length in this specimen was 186 mm., making the cephalic index 85·4.

The average breadth of those skulls I have measured, together with those given by Dr. Solis, five hundred and sixty-one in all, was 139·7 mm.

The least diameter in my list was 125 mm., but Dr. Solis gives one of 124 mm. This skull had a cephalic index of 71·68, the length being 173 mm.

The general shape of the Chilian cranium is mesocephalic, or brachycephalic, the average index lying between 78 and 80. There is, however, no very great uniformity.

In a series of skulls from southern Chile, two hundred and forty in number, sixteen were 77 and under, forty-two were between 78 and 80, the rest being above that figure, twenty-one passing 84. The medium in this series was 79·65. This, however, gives a false impression of the series, as the majority lay between 80 and 82.

In another series of one hundred and three skulls from the central provinces, twenty-seven were 77 and under, thirty-two varied between 77 and 80, and forty-four were above this last figure. Of these last, there were five with an index of 85, three of 86, three of 87, one of 88, and three of 89. The most dolichocephalic were two of 74, three of 73, two of 72, and two of 71. The mean average of the series was 80.

In a third series of one hundred and thirty-nine, from the northern provinces, only twenty were under 77, fifty-one were between 77 and 80, and sixty-eight above it, the average being 80·45.

Dr. Solis, in his series, gives the average as 79·817; being 80 in the case of thirty-five women and 79·628 in forty-five men. 88·3 was the highest, and 70·46 the lowest of the series.

From these figures, it results that the mean cephalic index of the five hundred and sixty-one skulls measured, is 79·91, being that generally ascribed to South Americans as a whole.

The altitudinal index is very little lower than the cephalic, indeed the similarity between the height (basio-bregmatic) and the transverse diameter, in the majority of skulls, is very marked.

The following are the figures for the index and the mean height in the three series of skulls:—

	Index.	Mean height.
Series 1. (240 skulls)	77·21	136 mm.
Series 2. (103 skulls)	77·39	136·1 mm.
Series 3. (139 skulls)	77·16	135·8 mm.

Dr. Solis gives 77·02 and 135·5.

The uniformity of these figures is noteworthy, especially if the number of skulls measured is taken into consideration.

The skull with the greatest altitude that has come under my notice measured 151 mm. from the basion to the bregma, and the least 121, with indexes respectively of 79·12 and 72·27. I have in my possession, at the present moment, three Chilian skulls with a basio-bregmatic altitude of 149 mm.

Frontal Measurements.—On studying these measurements, the low type of the skull is made especially clear. The lower classes of the Chilians have extremely narrow, retreating foreheads, much more so than the Indian tribes of the North and South. In the three hundred and five skulls, from which I obtained these measurements, the stephanic index was 81·5, that given by Dr. Solis 82·2, the frontal index in both cases being about 66. But this says little or nothing, as it depends largely on the relative proportions of the diameters compared. For this reason, I consider it advisable to give the actual measurements, which, in this case at any rate, are far more eloquent. In the three hundred and five skulls the averages were as follows:—

Frontal maximum	115 mm.
„ minimum	92·1 mm.
„ medium	104·5 mm.

In the seventy-seven skulls measured by Dr. Solis:—

Frontal maximum	116·5 mm.
„ minimum	93· „
„ medium	105·2 „

According to Broca's list, the only races that give such a low average are twenty-eight Chinese, with a minimum of 92·5, and twelve Australians with a minimum of 92·7.

Circumferences.—1. *Horizontal*, taken from the glabello over the orbital ridges and inion. In two hundred and sixty males it was 506·1 mm., and in two hundred and twenty-one females 494·7 mm. Dr. Solis gives for forty-five men 508·7 mm., and for thirty-five women 493·5 mm.

2. *Vertical.*—This circumference is curiously similar to the horizontal, being in the five hundred and sixty-one skulls, 501·6 mm.; males 508·2 mm., females 495·1 mm.

3. *Superauricular.*—In the men's skulls, 312 mm., and in the women's, 295·7 mm.

M. Broca gives, as his lowest average of horizontal circumferences, that of ten Hottentot women, 483·6 mm. In going through my list I find twelve female skulls with a lesser circumference; one, to which I have already made reference, being as low as 470 mm. Dr. Solis also gives five below that average, one of which was that of a man (482 mm.).

The skulls, as a whole, are symmetrical, narrow in the frontal region, and extraordinary developed in the iniac and subiniac regions, the massive occipital torus, common to many of the South Sea islanders, being a common characteristic, and often having a transverse diameter of 60 or 70 mm. Wormian bones are common, especially the epactal, which frequently assumes enormous proportions.

I have a skull before me at present, in which this bone extends across the back of the skull almost to the temporo-occipital suture, and has the following dimensions: horizontal breadth 121 mm.; vertical diameter 50 mm.

The sutures, as a rule, are well marked, especially the lambdoidal, which is nearly always the most serrated. Occasionally, the sagittal suture presents signs of synostosis, in some cases becoming completely obliterated, but in no case is the cranium scaphocephalic. In no instance have I found an example of an interparietal bone, although such are said to be common in the Indian skulls of northern Chile, Peru, and Bolivia. The male skulls are frequently marked with rugged temporal crests, and in the case of the large-headed type of which I have made mention, the superciliary ridges are usually very prominent, while the glabello is often sunken. In the other smaller-headed people, neither the temporal crests, nor the supraorbitary ridges are, as a rule, very much developed.

Facial Measurements.—In these measurements there is great variation, and it is comparatively easy to establish the existence of two racial types, distinguishable even to a superficial observer.

One of these is distinguished by the larger size of the skull, broad face, receding forehead, pronounced prognathism (both facial and sub-nasal), and square massive jaw; the other, by having a smaller skull, narrow face, smaller orbits and nasal measurements, narrow pointed jaw, and a very slight prognathism. These are the two extremes; between them lie about sixty per cent. of the population, which forms the average type.

Zygomatic Diameter.—This diameter will give a better idea than anything else of the difference in the two types, varying as it does from 110 mm. to 144 mm. The mean advantage of this diameter in the two hundred and ninety-eight skulls I have measured was 126·6 mm. and of the eighty measured by Dr. Solis, 125·6 mm., being 126·39 mm. for the three hundred and seventy-eight skulls. Taking Pruner Bey's list as a standard, we find that his highest average is 137 mm., and his lowest 123 mm.

In the series of three hundred and seventy-eight skulls under discussion, if we take these two averages just given as typical of the two groups, we obtain, in the one, fifty-one skulls with a diameter above 137 mm.; and in the other, ninety-seven with a diameter less than 123 mm. Each of these groups is thus sufficiently numerous to be regarded as belonging to different types.

In the same series (378) the ophryo-alveolar index was slightly under 72, being higher in the skulls of the females than in those of the males, owing to the lesser zygomatic diameter of the former. The two types are also seen in these indices; of the fifty-one skulls, forty-three had an index of less than 65, and of the other group of ninety-seven, ninety-six were above 73.

A comparison of these measurements shows that about a third of the skulls measured have more or less similarity to the Iberian type, while about a seventh approach the type of the Araucanians. It is to be presumed that the small faces and features of the majority of the Chilians are inherited from European ancestors, as the Indian tribes, both to the north and to the south, have a pronounced Mongolian type of countenance.

Orbits.—In both groups the orbital index is high. More than fifty per cent. of the three hundred and seventy-eight skulls measured were above 90. The average of the whole series was slightly over 88. The average horizontal diameter was 40·2 mm., and the average vertical diameter 35 mm. A peculiarity, which is nearly general, is the great obliquity of the orbits, which are rhomboidal in form. The longer axes meet more or less on the metopic point or very slightly below it, while the lesser axes are often nearly horizontal.

Nasal Measurements.—The nasal index in the same series of three hundred and seventy-eight skulls was 48, about that of southern Europeans, placing the Chilians in the mesorhinic group; although a large proportion are leptorhinic or narrow-nosed, 45 and under, while about one-sixth of the population are platyrhinic, with an index of 54 and above. These two latter groups correspond almost exactly to the narrow and broad faces respectively. The average length of the nose from the nasal spine to the nasal base was 52·2 mm., and the average maximum breadth 25·1 mm.

Angles.—I have been able to obtain very few exact data in regard to the cranial and facial angles, owing chiefly to want of instruments of precision; those I have obtained are only approximate. However, if not mathematically precise, they may serve to give a rough idea of some important measurements.

Prognathism.—Facial 81°; sub-nasal 77°.

For both these angles, I have used the condyle-alveolar plane as base, the ophryo-alveolar, and the spino-alveolar lines forming the other sides of the angles respectively. These angles were taken with a craniophore, somewhat resembling that of Topinard.

Facial angle.—(83 skulls) 50°, more or less. Base, supraorbital-alveolar line; vertex, auditory-foramen plane.

Frontal angle.—(83 skulls) 54°, more or less. Base, supraorbital-bregmatic line; vertex, auditory foramen plane.

Daubenton's angle.—(83 skulls), about 6° positive. Besides these angles, I here give those taken by Dr. Solis.

M. Segond's Facial angle.—(8 women) 51°, 3; (8 men) 52°; vertex, at the basion; sides basi-alveolar and ophryo-basilar lines.

M. Segond's Cranial angle.—(8 women) 152°, 1; (8 men) 148°, 6; vertex at basion; sides basi-ophryo line and the plane of the foramen magnum.

M. Segond's Posterior bregmatic angle.—(8 women) 90°, 2; (8 men) 92°, 1.

The vertex of this angle is the point where the prolongation of the basio-bregmatic line cuts the condyle-alveolar plane; the sides run to the bregma and the lower edge of the condyles.

OTHER CHARACTERISTICS.

As might be supposed from the cranial capacity, the Chilian lower class population have scanty intellectual powers, often even less than the aborigines whom they have succeeded. They are, for that same reason, extremely superstitious, many of the common beliefs being so absurd as to evoke the astonishment of a casual observer. I hope shortly to be able to arrange a collection of notes, extending over twelve years of observations, treating especially on this point and the popular folk-lore of the country.

In the schools, the superiority of children of foreign, that is to say, of European, parentage is noteworthy. This superiority extends to later life; in commerce, science, art, politics and general enterprise, the most celebrated names are frequently foreign. This may be a result of a comparatively new civilization; but it is curious to note how, beginning together, the one in nearly every instance outdistances the other. After five years' experience as a professor in the Chilian *liceos*, I have come to the conclusion that the principal cause of this is the apathetic nature of the race itself, which, while content to follow in a given routine, has not sufficient inherent energy to branch out into original work or thought.

The language spoken is Spanish, but much mutilated, and interspersed with local expressions and Indian words, especially in the south. Chile is undoubtedly the country in South America where Spanish is most badly spoken, both in respect of pronunciation and the number of mannerisms.

The national vices are drunkenness and dishonesty, both in word and deed. This is largely due to an entire absence of moral training, either in the home or in the school.

The religion is nominally Roman Catholic; but among the upper classes it exists in little more than name, except among the women; while in the lower rural classes, it has almost degenerated into a species of fetishism. In fact, judging from personal observations, I doubt if, among the very lowest order of the population, the intellect is sufficiently developed to comprehend the mysteries of a highly organized religion, such as that of the Roman Church, which belongs, metaphysically, to a high state of civilization. This has long been my opinion in regard to missionary labours among low caste peoples, a position which I hope shortly to have an opportunity of explaining, as it throws some curious light on the psychology of religion in respect of its anthropological bearing.

Table I.

Measurements of 15 Skulls of Large-Headed Type. (All Males.)

Measurements.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average.
	cc.	cc.	cc.	cc.	cc.	cc.	cc.	cc.	cc.	cc.	cc.	cc.		cc.	cc.	cc.
Capacity	1,490	1,620	1,660	1,550	1,650	1,538	1,540	1,660	1,475	1,605	1,520	1,595	1,495	1,525	1,560	1,565
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Glabello-occipital	187	188	172	174	188	190	181	181	180	182	180	186	178	175	185	181·8
Transverse (maximum)	150	145	150	148	150	152	146	146	141	155	145	157	140	148	142	147.6
Frontal (maximum)	120	123	131	119	119	113	119	130	125	130	127	129	113	121	117	122·4
Frontal (minimum)	96	100	100	96	100	94	102	100	101	98	105	103	92	99	98	98·2
Altitude (basi-bregmatic)	144	149	143	137	147	144	143	144	134	141	145	138	140	149	142	143
Circumference (horizontal)	533	537	528	513	540	519	522	541	508	530	523	527	499	515	524	522·2
Circumference (vertical) ...	530	539	533	508	535	510	517	527	501	511	512	514	503	508	519	517·8
Frontal arc	130	134	135	131	132	129	133	134	128	130	130	131	129	121	115	129·4
Bregma to lambda	120	122	132	123	129	131	124	128	122	130	125	127	127	125	140	127
Superauricular arc	314	327	320	309	331	321	313	320	306	333	322	319	320	339	299	319·5
Zygomatic diameter	140	139	137	139	138	137	139	138	143	137	140	141	137	144	137	139
Orbital diameter (horizontal)....	42	39	42	41	43	42	41	41	43	39	41	42	43	41	41	41·4
Orbital diameter (vertical)	39	36	36	33	37	34	36	33	38	36	36	35	37	38	33	35·8
Nasal diameter (horizontal)	26	26	28	28	25	28	27	25	27	27	29	24	28	27	25	26·6
Nasal diameter (vertical)	57	54	56	48	49	48	53	49	51	54	49	45	47	51	48	50·6
Foramen magnum length ...	40	39	35	39	41	37	39	40	41	39	40	42	38	42	39	39·3
Foramen magnum breadth	34	35	29	33	34	33	35	35	33	34	33	36	34	35	36	34·
Cephalic index	80·2	77·12	86	85	79·7	80	80·66	80·66	78·33	85·1	80·55	84·4	78·6	84·6	76·7	81·1
Altitudinal index	77	79·25	83·1	79·13	78·2	75·7	79	79·56	74·44	77·4	80·55	74·2	78·6	85·1	76·7	78·6
Stephanic index	80	81·2	76·3	80·6	84	83·1	85·7	76·9	80·8	75·3	82·8	80	81·4	81·8	83·7	80·2
Orbital index	81·5	95	88·35	80·46	88	80·9	90·2	80·46	93	92	90·2	83·3	88	92·7	80·5	86·4
Nasal index	45·6	48·1	50	57·9	51	57·9	50·9	51	52·9	50	59·1	53·3	59·3	52·9	52	52·5
Foramen magnum index	85	89·7	82·8	84·6	82·9	89·1	89·7	88·8	80·4	87·1	82·5	85·7	89·4	83·3	92	86·5
Prognathism (facial)	81°	84°	82°	79°	80°	78°	81°	80°	83°	80°	81°	83°	84°	81°	79°	81°
Prognathism (sub-nasal)	76	78	77	73	72	71	75	77	76	72	73	78	79	78	74	75·3
Facial angle	47	52	51	48	51	48	49	50	49	50	51	48	48	51	49	49·4

TABLE II.

MEASUREMENTS OF 15 SKULLS OF SMALL-HEADED TYPE.

Measurements.	1♀	2♂	3♂	4♀	5♂	6♂	7♂	8♂	9♂	10♂	11♂	12♂	13♂	14♀	15♀	Average.
Capacity....	cc. 1,130	cc. 1,400	cc. 1,440	cc. 1,240	cc 1,280	cc. 1,490	cc. 1,400	cc. 1,335	cc. 1,330	cc. 1,280	cc. 1,295	cc. 1,305	cc. 1,390	cc. 1,255	cc. 1,325	cc. 1,326·3
Glabello-occipital	mm. 171	mm. 173	mm. 179	mm 173	mm. 180	mm. 180	mm. 173	mm. 180	mm. 181	mm. 177	mm. 175	mm. 177	mm. 171	mm. 173	mm. 174	mm. 175·8
Transverse (maximum)	132	138	145	133	137	145	136	137	139	137	134	134	142	124	137	136·6
Frontal (maximum)	109	110	120	110	100	118	118	119	118	112	115	111	120	107	115	113·4
Frontal (minimum)	87	91	94	92	85	97	91	98	92	91	91	86	91	89	95	91·3
Altitude (basi-bregmatic)	122	133	134	133	133	129	129	131	130	130	133	133	135	127	128	130·6
Circumference (horizontal)	480	490	507	491	505	490	497	492	495	504	495	493	490	480	511	496
Circumference (vertical)	478	496	493	489	505	496	501	490	493	498	492	495	496	468	513	494·9
Frontal arc	122	120	125	120	128	132	129	127	125	127	117	118	132	115	125	124·2
Bregma to lambda	102	130	125	121	122	123	127	126	122	120	122	124	123	108	127	121·4
Superauricular arc	270	305	316	292	293	310	301	299	298	320	317	320	310	282	315	303·2
Zygomatic diameter	114	116	117	117	117	120	120	121	118	123	118	117	125	110	112	117·6
Orbital diameter (horizontal)....	41	36	38	41	38	39	38	41	42	40	36	40	39	38	42	39·1
Orbital diameter (vertical)	35	32	32	36	30	35	36	36	38	37	34	37	35	35	34	34·1
Nasal diameter (horizontal)	25	23	24	28	22	22	24	27	24	23	24	24	22	23	27	24·1
Nasal diameter (vertical)	52	50	50	50	43	53	49	53	52	48	49	50	53	44	48	50·8
Foramen magnum length	40	38	41	35	41	40	40	32	39	40	41	37	39	35	38	38·4
Foramen magnum breadth	30	32	30	28	33	33	34	29	34	32	35	33	35	29	32	31·9
Cephalic index	77·2	79·7	81	76·9	76·1	80·5	78·6	76·1	76·8	76·9	76·5	75·7	83	71·6	79·8	77·7
Altitudinal index	71·34	76·8	74·8	76·9	75	71·6	74·5	72·7	71·2	73·3	76	75·1	78·9	73·4	73·5	73·7
Stephanic index	80	82·7	78·3	83·6	85	82·2	77·1	82·3	78	81·2	79·1	77·4	75·8	83·1	82·6	80·5
Orbital index	85·3	88·8	84·2	87·8	78·1	89·7	97·2	90·2	90·5	92·5	94·4	92·5	89·7	92·1	80·9	87·2
Nasal index	48	46	48	56	51·1	41·5	49	50·9	46·1	47·9	49	48	41·5	52·2	56·7	47·4
Foramen magnum index	70·5	84·2	73·1	80	80·4	82·5	85	90·6	87·1	80	85·3	89·1	89·7	82·8	84·2	82·5
Prognathism (facial)	84	81	82	80	81	84	83	82	79	81	82	80	86	84	82	82
Prognathism (sub-nasal)	81	79	79	77	78	80	80	77	76	77	79	77	81	80	76	78·4
Facial angle	47	48	47	49	48	50	49	48	47	48	51	47	49	46	49	48·1

The index of the averages and not the average of the indices has been taken.

NOTES ON THE TABLES OF MEASUREMENTS.

Table I.

It is worthy of notice that, although the average cranial capacity in Chilian males is only 1,460, this series is very much above that figure. For this reason I have called them large heads. In Broca's list only a few of the European races reach this capacity.

Frontal Minimum.—This average is extremely high, being passed only in one instance in M. Topinard's list, and that in the case of the Lapps. But the forehead, although very wide, is depressed and retreating.

Altitude.—This is one of the chief characteristics of this type. The average height of the fifteen skulls being 143 mm., and the index 78·6; a higher figure, as an average, than any other in any list I have seen. Broca in his lists gives 78 as the maximum average known to him.

Zygomatic diameter.—This is another of the peculiarities of type, being 139 mm. in fifteen skulls. Topinard gives 137 as the maximum.

These skulls were taken partly from my collection, and partly from the measurements of Dr. Solis; they are sufficiently similar to show the principal characteristics of the type they represent.

Table II.

Of these skulls, Nos. 1, 4, 14, and 15 are female. Here it is to be noted that the average capacity is considerably below the mean average of the two hundred and one skulls measured, being approximately about that of the women alone. It will be noted, that the cephalic index is also less, being in this case 77·7 as against 81·1 in the other type.

Frontal Minimum.—In this case, it is as small as it was large in the other, 91·3, less even than in the Australians. From what race is this peculiarity inherited?

Zygomatic diameter.—Excessively low, being only 117·6 mm., 6 mm. less than the lowest series given by the French anthropologists, and reaching in two cases 110 mm. and 112 mm. respectively.

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ON THE INHERITANCE OF THE MENTAL AND MORAL CHARACTERS IN MAN, AND ITS COMPARISON WITH THE INHERITANCE OF THE PHYSICAL CHARACTERS.

The Huxley Lecture for 1903.

BY PROFESSOR KARL PEARSON, F.R.S.

[PRESENTED OCTOBER 16TH, 1903.]

Introductory.—The Material and its Collection.

(1) THERE are probably few persons who would now deny the immense importance of ancestry in the case of any domestic animal. The stud-books, which exist for horses, cattle, dogs, cats and even canaries, demonstrate the weight practically given to ancestry when the breeding of animals has developed so far that certain physical characters possess commercial value. A majority of the community would probably also admit to-day that the physical characters of man are inherited with practically the same intensity as the like characters in cattle and horses. But few, however, of the majority who accept this inheritance of physique in man, apply the results which flow from such acceptance to their own conduct in life—still less do they appreciate the all important bearing of these results upon national life and social habits. Nor is the reason for this—or better, one out of several reasons for this—hard to find. The majority of mankind are more or less conscious that man has not gained his pre-eminence by physique alone. They justly attribute much of his dominance in the animal kingdom to those mental and moral characters, which have rendered him capable of combining with his neighbours to form stable societies with highly differentiated tasks and circumscribed duties for their individual members.

Within such communities we see the moral characters developing apparently under family influences; the mental characters developing not only under home training, but under the guidance of private and public teachers, the whole contributing to form a complex system of national education. To use technical terms, we expect correlation between home influence and moral qualities, and between education and mental power, and the bulk of men too rashly, perhaps, conclude that the home and the school are the chief sources of those qualities on which social stability so largely depends. We are too apt to overlook the possibility that the home standard is itself a product of parental stock, and that the relative gain from education depends to a surprising degree on the raw material presented to the educator. We are agreed that good homes and good schools are essential to national prosperity. But does not the good home depend upon the percentage of innately wise parents, and the good school depend quite as much on the children's capacity, as on its staff and equipment?

It is quite possible to accept these views and yet believe that the moral and mental characters are inherited in either a quantitatively or a qualitatively different manner from the physical characters. Both may be influenced by environment, but the one in a far more marked way than the other. Since the publication of Francis Galton's epoch-making books, *Hereditary Genius* and *English Men of Science*, it is impossible to deny *in toto* the inheritance of mental characters. But we require to go a stage further and ask for an exact quantitative measure of the inheritance of such characters and a comparison of such measure with its value for the physical characters.

Accordingly some six or seven years ago I set myself the following problem: What is the quantitative measure of the inheritance of the moral and mental characters in man, and how is it related to the corresponding measure of the inheritance of the physical characters?

The problem really resolved itself into three separate investigations:—

(*a*) A sufficiently wide inquiry into the actual values of inheritance of the physical characters in man.

This investigation was carried out by the measurement of upwards of 1000 families. We thus obtained ample means of determining both for parental and fraternal relationships the quantitative measure of resemblance.

(*b*) A comparison of the inheritance of the physical characters in man with that of the physical characters in other forms of life.

This has been made for a considerable number of characters in diverse species, with the general result that there appears to be no substantial difference, as far as we have been able to discover, between the inheritance of physique in man, and its inheritance in other forms of life.

(*c*) An inquiry into the inheritance of the moral and mental characters in man.

This is the part of my work with which we are at present chiefly concerned, and I want to indicate the general lines along which my argument runs.

In the first place it seemed to me absolutely impossible to get a quantitative measure of the resemblance in moral and mental characters between parent and offspring. You must not compare the moral character of a child with those of its adult parents. You can only estimate the resemblance between the child and what its parents were as *children*. Here the grandparent is the only available source of information; but not only does age affect clearness of memory and judgment, the partiality of the relative is a factor which can hardly be corrected and allowed for.

If we take, on the other hand, parents and offspring as adults, it is difficult to appeal to anything but the *vox populi* for an estimate of their relative moral merits, and this *vox* is generally silent unless both are men of marked public importance. For these and other reasons I gave up any hope of measuring parental resemblance in moral character. I confined my attention entirely to *fraternal* resemblance. My argument was of this kind. Regarding one species only, then if fraternal resemblance for the moral and mental characters be less than, equal to, or greater than fraternal resemblance for the physical characters, we may surely argue that parental inheritance for the former set of characters is less than, equal to, or greater than that for the latter set of characters.

In the next place it seemed impossible to obtain moderately impartial estimates of the moral and mental characters of *adults*. Who but relatives and close friends know them well enough to form such an estimate, and which of us will put upon paper, for the use of strangers, a true account of the temper, probity and popularity of our nearest? Even if relatives and friends could be trusted to be impartial, the discovery of the preparation of schedules by the subjects of observation might have ruptured the peace of households and broken down life-long friendships. Thousands of schedules could not be filled up in this manner. The inquiry, therefore, resolved itself into an investigation of the moral and mental characters of *children*. Here we could replace the partial parent or relative by the fairly impartial school teacher. A man or woman who deals yearly with forty to a hundred new children, rapidly forms moderately accurate classifications, and it was to this source of information that I determined to appeal.

I would refer at once to an objection, which I think is not real, but which I know will arise in the minds of some. It will be said that the temper, vivacity and probity of children is not a measure of the like qualities in the adult. The shy boy at school is not necessarily a shy man on the floor of the House of Commons or confronting a native race on the north-west frontier. Granted absolutely. But what we are comparing is what that boy was at school, with what his brother and sister may have been. We can legitimately compare for purposes of heredity a character of the larval stage of two insects, although that character disappears entirely when both are fully developed as *imago*.

It is possible that some allowance ought to be made for changes during the school period in the mental and moral characters, but I have not found that those characters change very substantially in their percentages with the age of the school children, the bulk of whom lie between 10 and 14. Accordingly, while the physical characters change during the school period, it did not to a first approximation seem needful to allow for age changes in the mental and moral characters.[1] Such changes may exist, but they do not appear to be so marked as to substantially influence our results.

In order to carry out this investigation I sought and received aid from the

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[1] An additional memoir on the change of mental and physical characters with growth is in course of preparation.

Government Grant Committee of the Royal Society. I have further to acknowledge the assistance I have received, in the task of reduction and computation, from a grant made to my department at University College, by the Worshipful Company of Drapers.

I had deemed it desirable to measure not only the mental and moral characters, but a wide range of physical characters also. These would act as a check on the whole work, for we knew perfectly well what the inheritance of these physical characters might be expected to be. They were further needed as part of a more general investigation into the relationship between the mental and physical characters in man. In order to confine the cost of the inquiry within reasonable bounds, a special headspanner was devised with the assistance of Mr. Horace Darwin of the Cambridge Scientific Instrument Company. This instrument has not the exactness, of course, of the metal callipers of the craniologists, but it affords, carefully handled, a quite adequate means of obtaining the maximum length, maximum breadth and auricular height of the living head. It had further the great advantage that, made in numbers, it cost comparatively little and could be distributed widely among teachers.

Schedules were then, after much consideration and some experimenting, prepared, in which teachers could briefly note the chief characteristics of the children under their charge. These schedules were white for a pair of brothers, pink for a pair of sisters, and blue for a brother and sister. Additional brothers were given on attached white, and additional sisters on attached pink sheets. With the schedules were distributed (*a*) printed directions for the use of the head spanner; (*b*) general directions as to the estimation of both the physical and mental characters; and (*c*) two additional series of lithographed instructions, which were suggested by special inquiries of the teachers who first began the observations. Copies of the schedule and the general directions are printed in Appendix I.

The material took upwards of five years to collect. Appeal was made through the columns of the educational journals to teachers of all kinds, and our observations were made not only in the great boys' public schools, in the girls' high schools and the grammar schools of the country, but in modern mixed schools, in national and elementary schools of all kinds, in board schools and private schools throughout the kingdom. Some 6000 schedules were distributed and between 3000 and 4000 returned with more or less ample data. I have most heartily to thank the masters and mistresses of nearly 200 schools in which observations have been made for me. In the midst of arduous professional claims on their time and energy, they have, in many cases at considerable personal inconvenience, recorded and measured the children in their charge, for a purpose only dimly foreshadowed to them. In no case could they realize on the basis of their own 10 or 20 schedules the value of the scientific inquiry to which they were contributing, for its success depended entirely on the combination of tens and twenties into hundreds and thousands, a possibility which even some of my keenest assistants despaired of during the years in which the investigation was in progress. We were, indeed, more than once confronted by an apparent drying up of all conceivable sources of new material. The number of schools is of course immense, but the means of reaching and interesting their masters and mistresses extremely limited.[1] It is only right and proper to place on record the names of my chief co-operators in this investigation. See Appendix II.

The list in Appendix II will not only show the class range of the schools dealt with, but also the great variety of localities which contributed. As far as the United Kingdom contains local races, we have fairly sampled them. Of course one would much prefer to have dealt entirely with a single district with little immigration, and thus have worked wholly within one local race, but a little consideration showed how impossible it was to get material enough for any safe conclusions from such a limited area. It is not one per cent. of teachers who can spare the time, or, being able to spare the time, have the imagination which will induce them to aid in co-operative inquiry of this kind. With the assistance of Mr. E. W. Adair an attempt at a limited area was made in the case of Guernsey. But we only succeeded in getting 150 to 200 schedules filled in. These were sufficient to show that a perceptible differentiation in the physical characters existed between Channel Island and English children. No differentiation in the psychical characters could be observed. Accordingly the Guernsey children were not pooled with the others for physical characters, but the material was far too insignificant in amount to justify a separate investigation of the statistical constants.[2] The influence of local race would undoubtedly make itself felt on our statistics, but taken broadly our constants represent the condition of things in the nation at large, and if any portion of the relationship between brothers and sisters is really due to local race, then we must inquire whether local race is or is not equally influential on the moral and mental characters. My belief that local race is not largely influential in this enquiry is based fundamentally on the following facts:—

(*a*) The constants of parental heredity deduced from my Family Records, made like the School Observations on members of many English local races, are closely like results found for such selected breeds as race-horses and greyhounds.

(*b*) The Family Records and the School Observations are for the fraternal relationships in excellent agreement.

Hence, while I admit the "local race" problem to be of first-class importance for many anthropological investigations, I do not think that to a *first* approximation, it has had sensible bearing on our present results.

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[1] I must not omit to acknowledge the courtesy of the editors of the *Journal of Education*, *The School World*, *The Schoolmaster* and other educational journals in publishing my appeals.

[2] While showing a certain differentiation, the general accord between the Guernsey correlations and those of the United Kingdom was remarkable, and extremely satisfactory when we want confirmation of the fact that, within broad lines, we are dealing with general "human" characters and relations, and not with something peculiar to "local race." As an instance I cite the "correlation ratio," η, a constant determining association,—for the case of head growth with age in girls. Guernsey Girls: $\eta = \cdot 44$; English Girls: $\eta = \cdot 46$. Considering that this Guernsey result is based on 110 cases only, the agreement is remarkable. We are clearly dealing with a constant of human growth in general.

So much may be said here about the nature and manner of collecting our material. The absolute classification and tabling has been a work of great labour. I have to thank in this matter my group of co-workers at University College, more especially Miss Alice Lee, D.Sc.; Miss Marie Lewenz, M.A., Miss E. Perrin, Miss Mary Beeton and Miss Margaret Notcutt have likewise aided me. More recently in the pressure of preparation for this lecture Mrs. W. F. R. Weldon and Miss F. E. Cave have come strenuously to my assistance. The chief labour of computing has fallen upon Dr. Alice Lee, but a considerable number of the tables have been re-done or revised by myself. Miss F. E. Cave has either computed, or reworked and computed, a considerable number of the head measurements and growth with age tables (not here published) necessary for the reduction of head measurements to a uniform age. To Miss M. Lewenz I owe aid in the computation of the health, ability and athletics data. In short, although *I* may be giving the Huxley Lecture, the work is essentially the result of a co-operative investigation extending over a number of years, and depending upon a body of collaborators, without whom it would have been quite impossible to deal with, much less to collect, the extensive data on which my results entirely depend.

(ii.) *Nature of the Theory Applied.*

Much of what I have to say upon this point would not be new to those who have examined recent biometric work, and some of it would not be intelligible except to the trained mathematician. Still we must strive in broad lines to see how the work has been done, and above all, to justify our treatment of the psychical characters.

To illustrate the method I will examine a little at length the degree of resemblance of brothers in a physical character. I choose cephalic index and this for two reasons:—

(*a*) Because from the first few years of life onwards the cephalic index scarcely changes with growth.

I have not yet investigated my own school data from this standpoint, but I have every confidence in the care taken by the late Dr. W. Pfitzner in his elaborate system of measurements, and the above is the conclusion he reaches.[1]

(*b*) Several great authorities have recently stated that they do not "believe" in the cephalic index, *i.e.*, consider it of small value for anthropometric purposes.

In Table E (i), Appendix III, we have the cephalic index given for 1982 pairs of brothers. This table is, I hope, perfectly intelligible. Taking the boys, for example, with cephalic indices between 74 and 75, these boys had 78 brothers who were distributed according to the arrangement in the column headed 74 to 75. Brothers are not alike in cephalic index, but distributed with a considerable range of variation. We now take in the usual way the arithmetic mean of this array of brothers, and find it to be 77·45. The average brother of a boy with cephalic index = 74·5 has an index of 77·45. This is the phenomenon of regression towards the general population mean (78·9) as discovered by Francis Galton. Now turning to Diagram I we plot to 74·5, the mean brother 77·45, and doing this for all arrays we get the series of points there exhibited. You will see at once that they lie almost exactly on a straight line. This is the well-known regression line. If that line had a slope of 1 in 1, the brother of 74·5 would have a mean brother of 74·5 cephalic index. If it had no slope at all the brother of 74·5 would have a brother like the mean of the general population. In the one case we have absolute resemblance, in the other case no resemblance at all. The actual degree of resemblance, our brothers being equally variable, is measured by the steepness of this regression line. In our case that steepness is ·49, almost ·5 or 1 in 2. That is the measure of fraternal resemblance in brothers for cephalic index—the correlation between brothers as we term it.

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[1] *Zeitschrift für Morphologie u. Anthropologie*, vol. i, 1899, p. 372. My schoolboys from all districts give 78·9; 3000 criminals of adult age from all districts give 78·5—there is not much room for sensible growth change in these juvenile and adult results. Observations of my own on actually the same growing children, show very small, if any change.

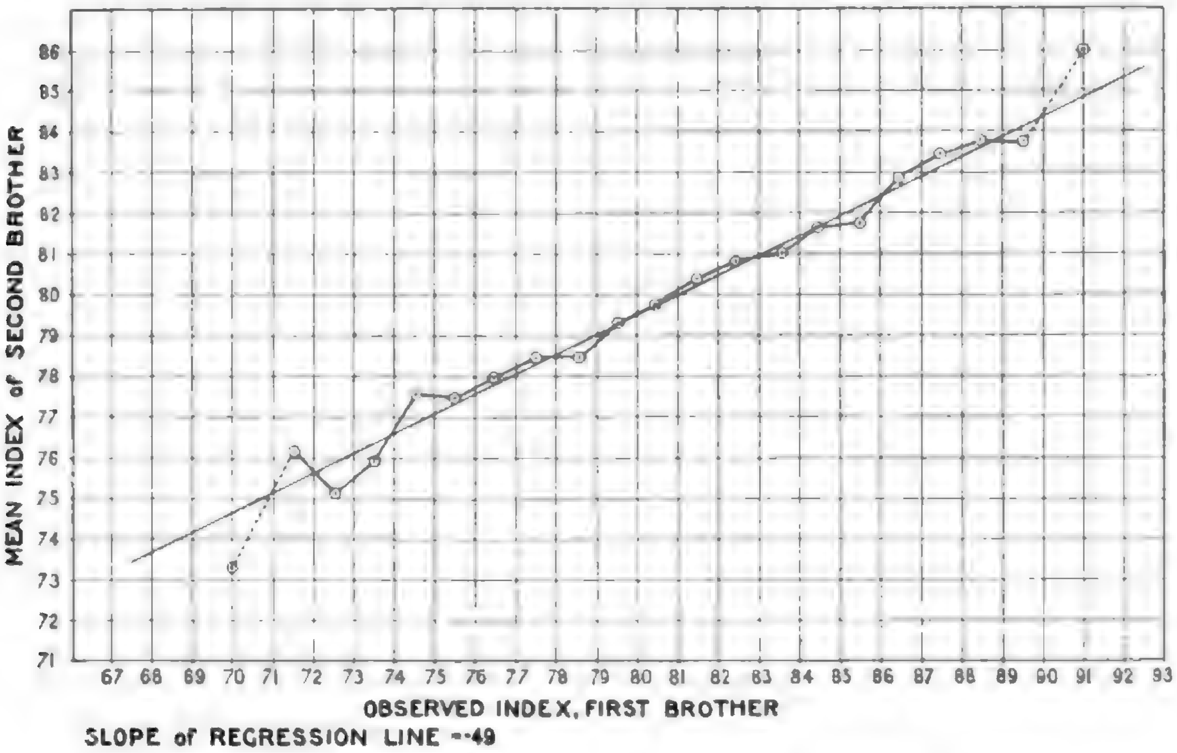

DIAGRAM I.—RESEMBLANCE OF BROTHERS IN CEPHALIC INDEX.

Now we have learnt two great features of inheritance in man. First, that the points in Diagram I, within the limits of observation are on a line, and secondly, that the slope of this line is about ·5. Are these results true for characters other than the cephalic index? Undoubtedly for all the physical characters yet worked out in man. Here are additional illustrations: see Diagrams

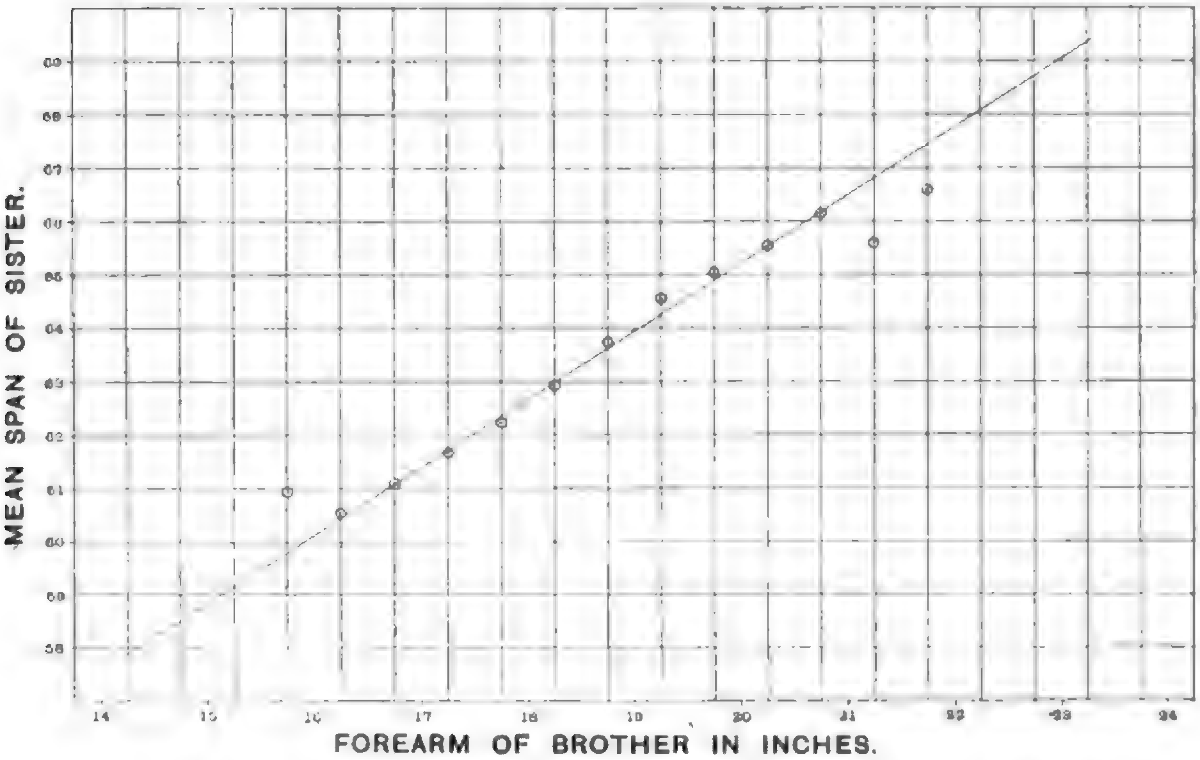

DIAGRAM II.—RESEMBLANCE OF SISTER'S SPAN TO BROTHER'S FOREARM.

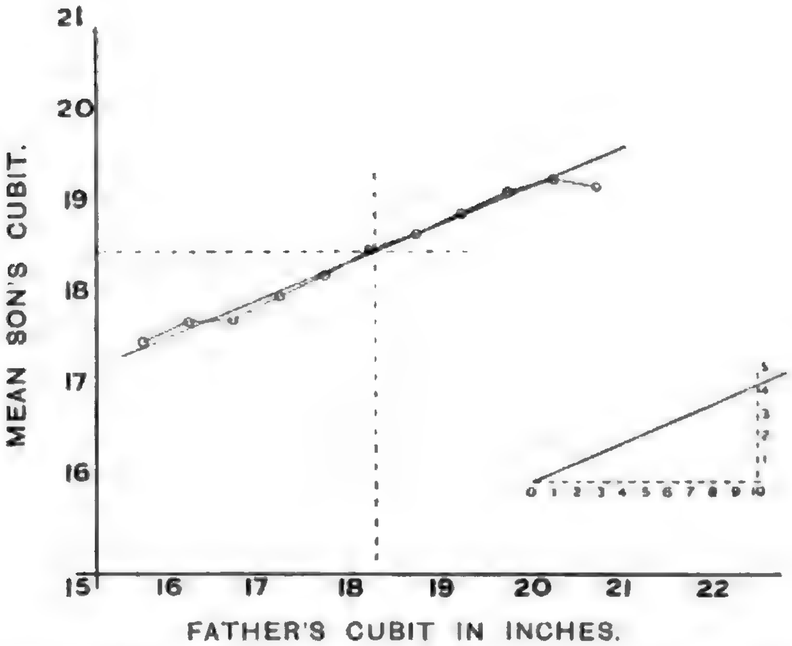

DIAGRAM III.—RESEMBLANCE OF FATHER AND SON IN CUBIT.

II–IV.[1] We cannot hesitate about the regression line being essentially linear. Has it for brethren usually a slope of about ·5 ?

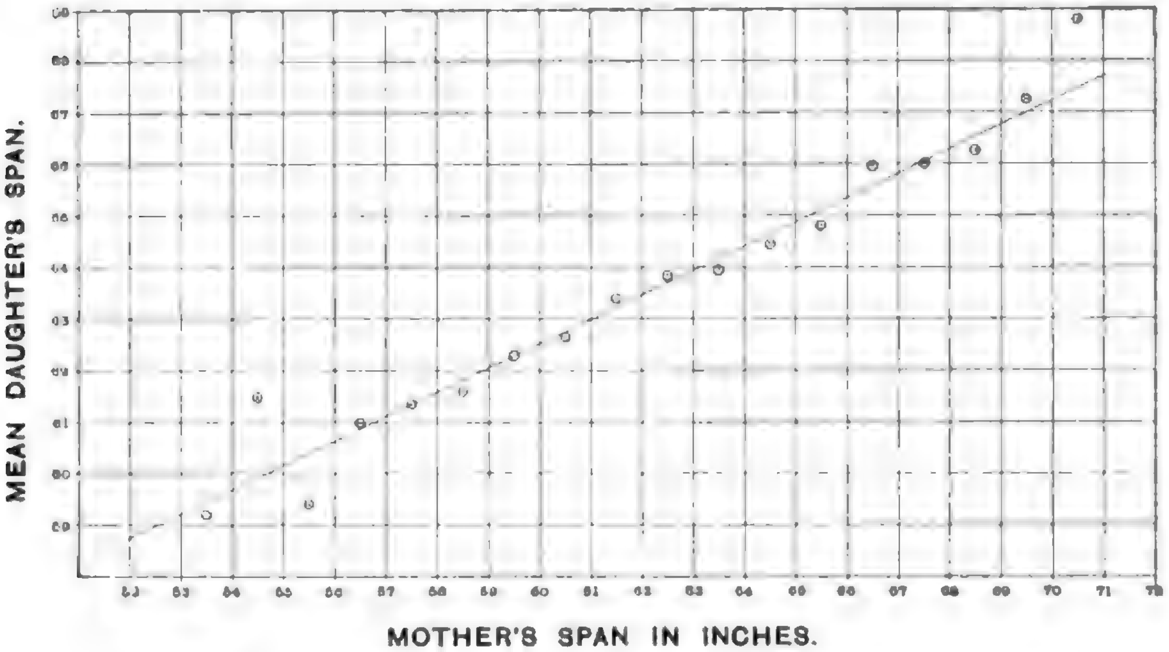

Diagram IV.—Resemblance of Mother and Daughter in Span.

In Table I are given my observations on some 1000 families for adult brothers and sisters. You will see that the steepness of the regression line is essentially about ·5.

TABLE I.

Inheritance of the Physical Characters.

Records of Adults.

Character.	Correlation.		
	Brothers.	Sisters.	Brothers and Sisters.
Stature...	·51	·54	·55
Span	·55	·56	·53
Cubit	·49	·51	·44
Eye Colour	·52	·45	·46
Mean	·52	·51	·49

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[1] Diagrams II and IV are reproduced from a memoir by the author on "Inheritance of the Physical Characters in Man," *Biometrika*, vol. ii, pp. 362–3, and Diagram III from an article in the same *Journal*, vol. ii, p. 216, on the "Law of Ancestral Heredity."

In Table II are given my observations on the head measurements of school children. We note at once precisely the same convenient number ·5.

I think we, therefore, may safely conclude that for the measurable physical characters in man, we have a quite definite regression line, and that it ascends 1 in 2.

TABLE II.

Head Measurements on School Children.

Pair→	Brother-Brother.			Sister-Sister.			Brother-Sister.				
Characters.	Mean.	S.D.	Correlation.	Mean.	S.D.	Correlation.	Mean.		S.D.		Correlation.
							B.	S.	B.	S.	
Cephalic Index..	78·92	3·314	·4861	78·29	3·988	·5360	78·72	78·96	3 237	3·382	·4265
Head Length (12 years)	184·52	6·154	·5041	180·22	6·346	·4251	183·82	179·20	6·563	6·510	·4575
Head Breadth (12 years)	145·23	5·739	·5925	140·21	6·547	·6208	144·24	140·59	5·975	5·708	·5419
Head Height (12 years)	127·19	6·479	·5537	124·07	6·868	·5237	127·36	124·80	7·031	6·226	·4897
Mean.	—	—	·5341	—	—	·5264	—	—	—	—	·4789

S.D. = Standard deviation, the measure of the variability of the observed character.

It is proper before I go further, to explain how the results for resemblance between brothers and sisters of different ages in head measurements have been made. In the first place a growth curve for each sex and for every measurement was drawn; this growth curve simply consists in plotting the average size of head of a child of given age to that age. Diagram V, represents the growth of auricular height of head of the mean girl from 4 to 19 years of age. The observation points are then smoothed and we obtain the mean growth curve. I cannot stay to discuss these mean growth curves now, but it must be clear that they give us a method of ascertaining the mean head growth of a child from any one year of its life to any other. Now all children do not grow in the same manner, but as we are dealing with average results we shall obtain a reasonable measure of growth by using the growth curve of the mean child. By means of six growth curves like that shown, the length, breadth, and height of every child's head was reduced to the dimensions it would most probably have at the age of 12 years. Thus we were able to compare the likeness in head measurements of brothers at the *same* standard age. This is the method by which the inheritance of head length, breadth, and height, given in Table II was deduced.[1]

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[1] By a much more elaborate investigation in multiple correlation I found for resemblance between brothers in head length ·54 (see *R.S. Proc.*, vol. 71, p. 294). The growth correlation not being absolutely linear, I am not sure that that value is better than the ·5 of the present simpler method.

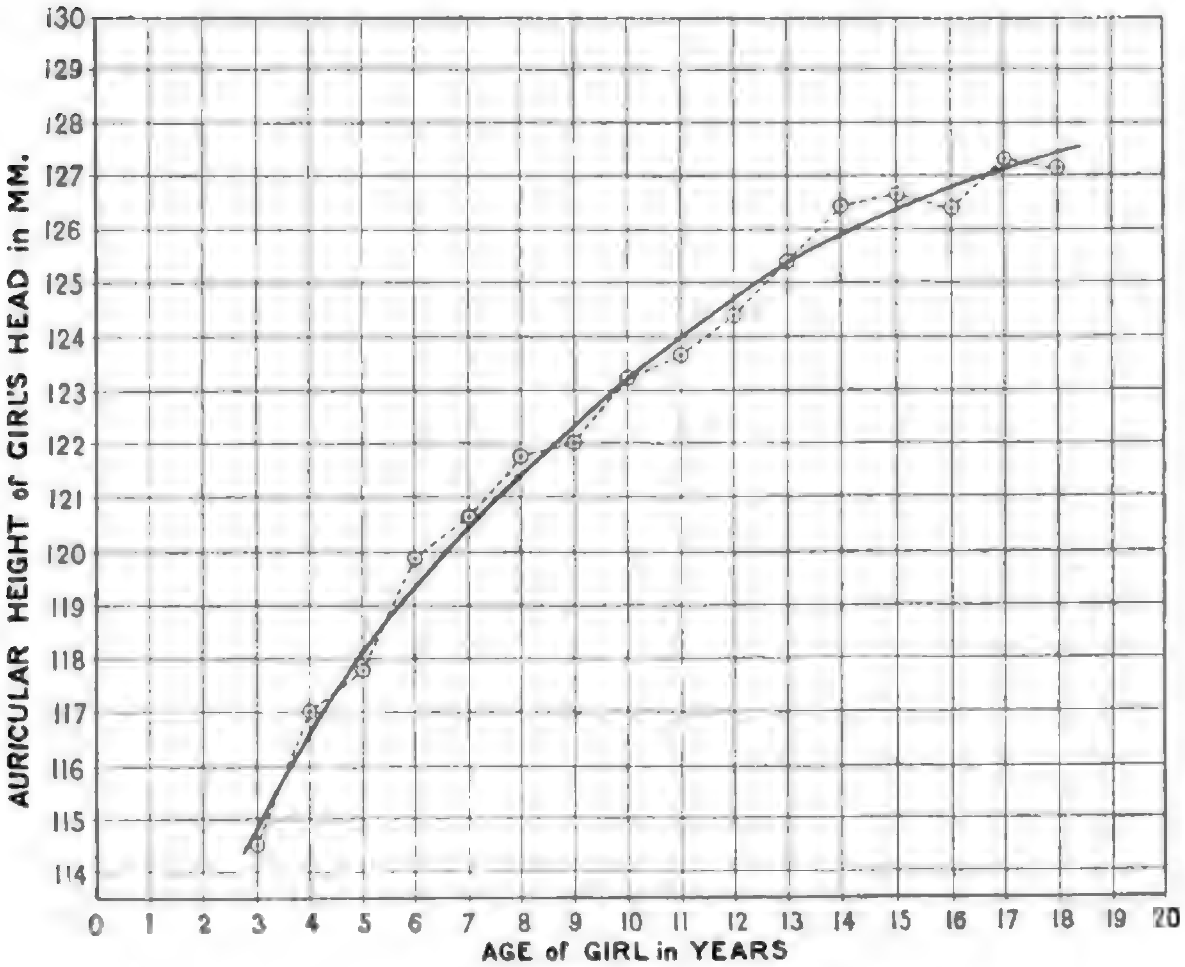

DIAGRAM V.—GROWTH OF AURICULAR HEIGHT IN GIRL'S HEAD.

Now what are we to understand by "believing" or "not believing" in the value for anthropological purposes of any character? Surely the main point for such purposes is the question of whether or no it be inherited and have small variability within the group? I don't think if we look at Table II we shall find the cephalic index worse than other head measurement, especially if we stick to one sex. It has an inheritance coefficient of about ·5, just what for practical purposes we have found for other physical characters.

So far we have seen surprising uniformity in the inheritance of the measurable physical characters. How are we to extend our results to physical characters not capable of accurate measurement, and to psychical characters? Clearly the whole problem turns on this: Can we find the steepness or slope of this regression line without all the paraphernalia of the correlation table and the means of arrays? The answer is: Yes; providing we assume a certain distribution of frequency for the character in human populations. This distribution of frequency is given by the Gauss-Laplacian normal curve of deviations from the mean. Grant this distribution, and by very simple classifications indeed we can determine the steepness of the regression line. Now the problem before us is the following one:—Is this assumption legitimate? It is certainly not true for organs and characters in *all* types of life. But it really does describe in a remarkable manner the distribution of most characters in mankind. We have shown that within the limits of random sampling, it is very true for a great variety of characters in the human skull.[1] Dr. Macdonell has demonstrated it also for measurements on criminals, and you can be fairly convinced of its suitability by looking at one or two diagrams. Diagram VI gives the distribution of nearly 2000 boys in cephalic index; Diagram VII the distribution of stature in 1000 women; Diagram VIII the distribution of head breadth in 3000 criminals.[2] I should be the last to assert that no human characters can be found that do not diverge sensibly from this Gaussian distribution. But I believe they are few, and that for practical purposes we may with nearly absolute safety assume it as a first approximation to the actual state of affairs. This being once granted we can obtain the slope of our regression line by an exceedingly simple process. We can make a mere classification of the following kind, say, into boys with breadths of head below 145 mm., and boys with breadth of head above 145 mm. For example, here is a simple classification of 2022 pairs of brothers by this process:—

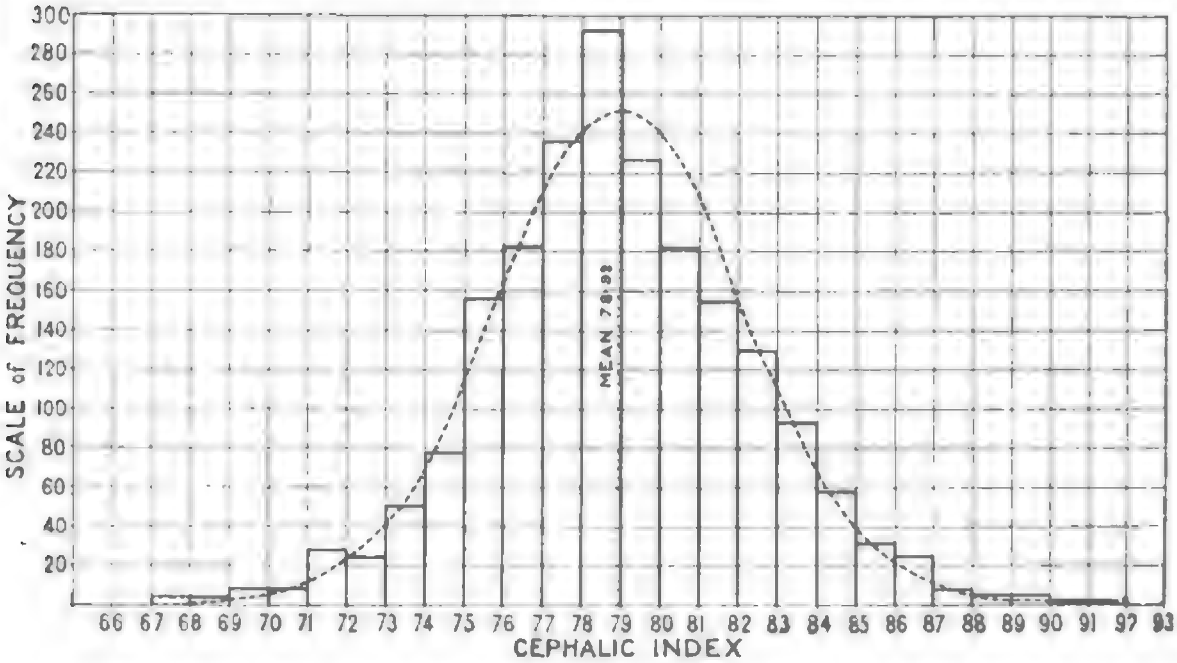

Diagram VI.—Distribution of Cephalic Index in 1982 Boys.

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[1] *Biometrika*, vol. i, p. 443.

[2] Diagram VII is from a paper on the "Inheritance of the Physical Characters in Man," *Biometrika*, vol. ii, p. 364, and Diagram VIII from Dr. Macdonell's memoir in the same *Journal*, vol. i, p. 184. I have gratefully to acknowledge the kindness of the proprietors of that *Journal* for allowing me to illustrate the present memoir by using Diagrams II, III, IV, VII and VIII.

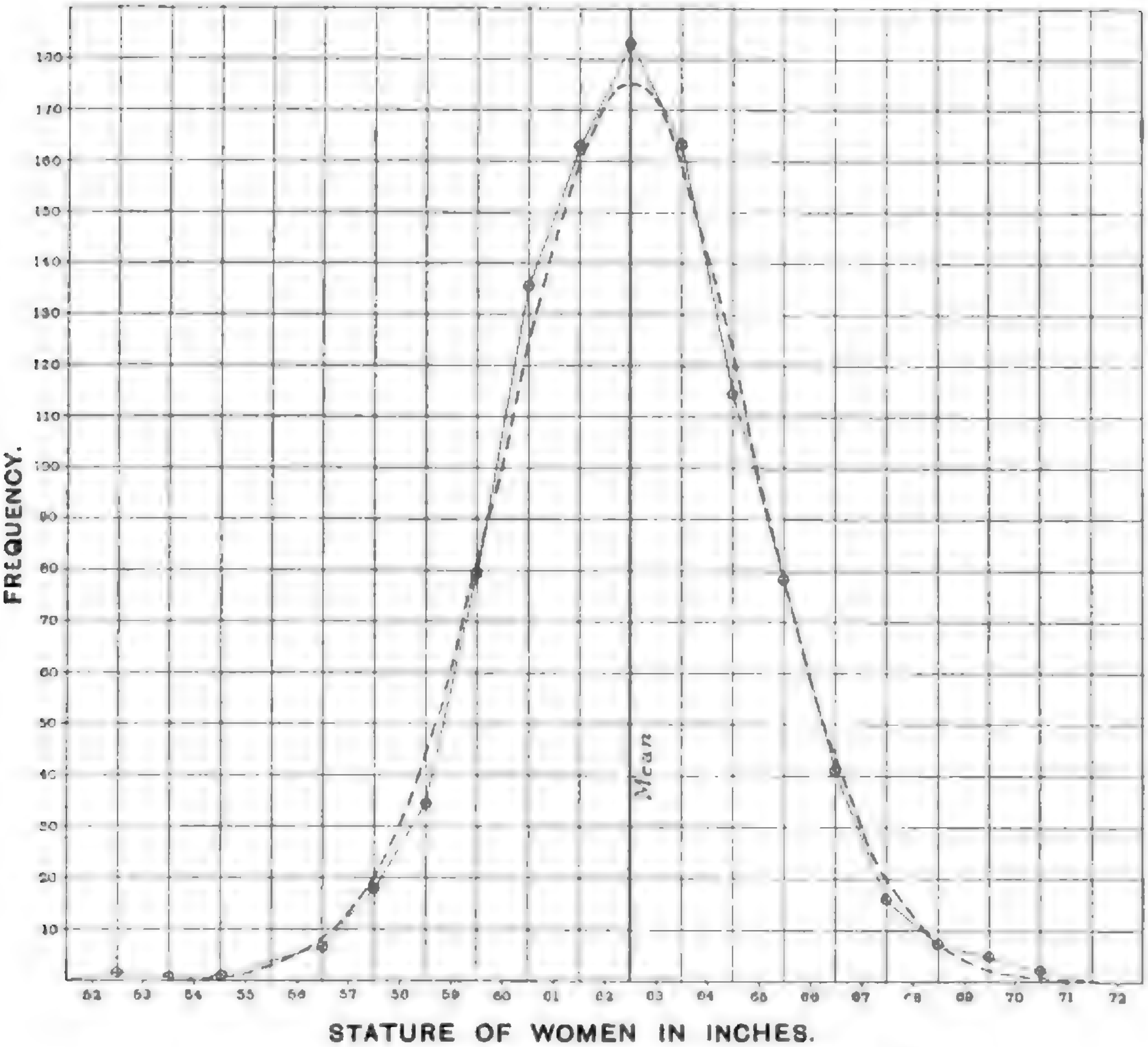

DIAGRAM VII.—DISTRIBUTION OF STATURE IN WOMEN.

Breadth of Head.

First Brother.

		Below 145.	Above 145.	Totals.
Second Brother.	Below 145 ...	635·5	307	942·5
	Above 145 ...	307	772·5	1079·5
	Totals ...	942·5	1079·5	2022

The result is precisely the same as dividing this ring model (*exhibited at the lecture*) by a pair of rectangular planes and counting up the number of rings in each of the four spaces.

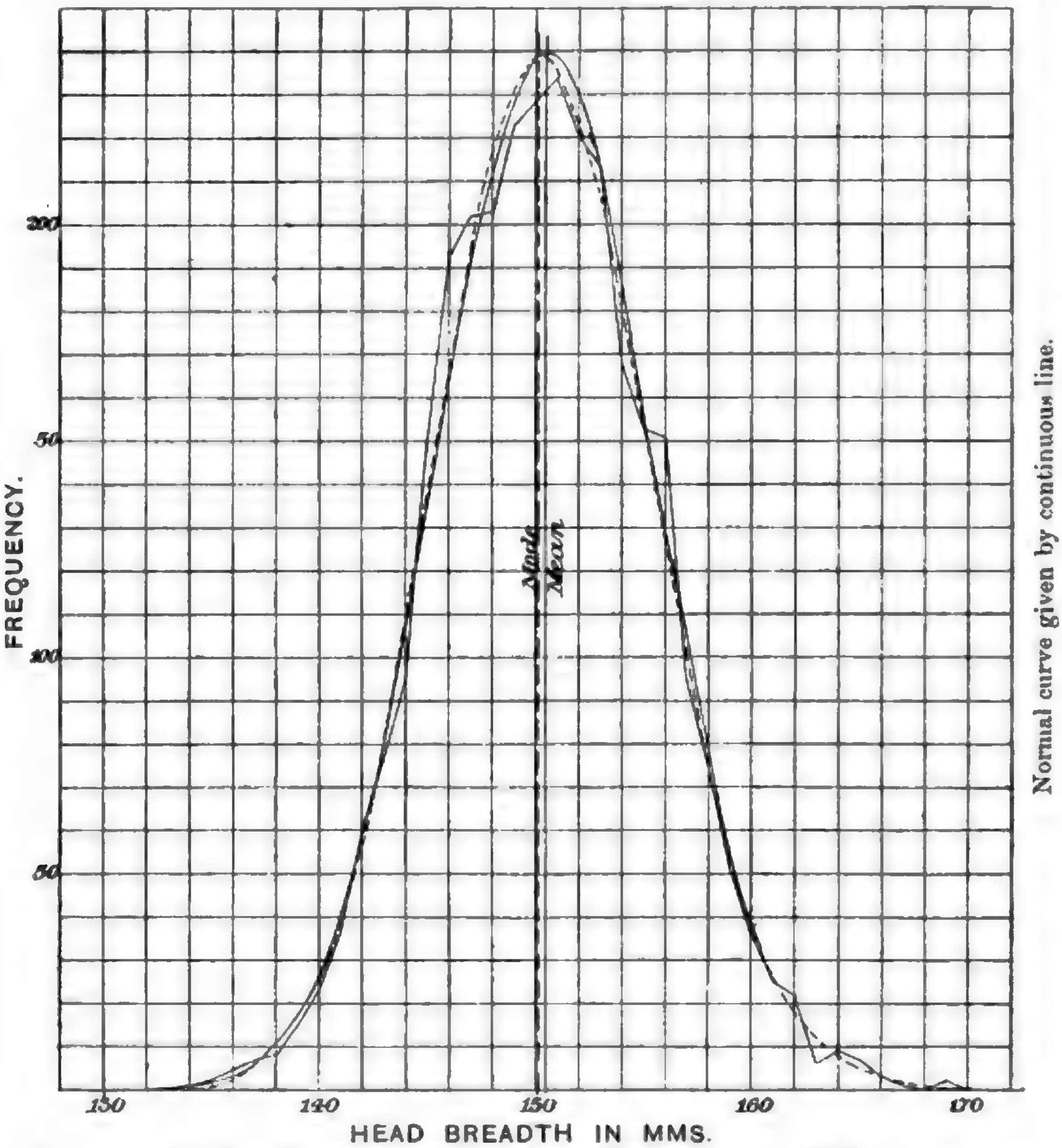

DIAGRAM VIII.—DISTRIBUTION OF HEAD BREADTHS IN 3000 CRIMINALS.

Now from such a division the mathematician can deduce[1] the slope of the regression line on the assumption of normal distribution. Here, to give us confidence, are the results for head breadth and height in boys, which were worked out both ways:—

Resemblance of Brothers.

	Long table.	Fourfold division.
Head Breadth	·59	·58
Auricular Height	·55	·56

For practical purposes these results are identical.

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[1] Mathematical Contributions to the Theory of Evolution. VII. "On the Correlation of Characters not Quantitatively Measurable," *Phil. Trans.*, vol. 195 A, pp. 1–47.

Accordingly let us assume this fourfold division will work, and investigate by means of it a non-quantitatively measurable physical character in man. I choose *Health* as an example. In Table A (i), Appendix III, we have the distribution of health in a population of 1918 school boys, and in Diagram IX, we have the arrangement of the same material, supposing it to follow a normal curve. My five classes were (i) *Very Strong*; (ii) *Strong*, being here used not in the sense of physically strong, but of *Robust*; (iii) *Normally Healthy*; (iv) *Rather Delicate*; and (v) *Very Delicate*. You will see that the "modal" boy is somewhat on the normally healthy side of robust, but that the *Very Robusts* are more numerous than the *Very Delicates* and the *Robusts* than the *Delicates*. I think the scale is not without suggestiveness even as a general health distribution for the population at large. It gives us for the first time an exact measure of the ranges of delicacy and robustness in terms of normal health.

Now I applied this scale to the relation between brothers in health character. I plotted up at the mean of robust boys, a length on this scale equal to the mean on the same scale of the array of brothers of these robust boys; there was naturally a regression towards normal health. I did this for all the possible five arrays,[1] and I thus obtained the five points given in Diagram X. You will see at once that our five points lie quite nicely distributed about the regression line as found by the fourfold division method discussed above. In other words, there can be little doubt that the general health of boys is a character which closely follows the normal law of distribution, and has a true line of regression. The slope of that line is ·52, or we may safely say that general health in the community is inherited in precisely the same manner as head-measurements or body-lengths.

I now come to the fundamental idea of my comparison of the psychical and physical resemblance of brothers. Suppose we assume that moral and mental qualities in man, like the physical, follow a normal law of distribution, and that the regression is linear. What results shall we obtain by thus assuming perfect continuity between the physical and the psychical? No doubt the drums will begin to beat the tattoo, we shall hear talk of the hopeless materialism of some men of science. But to use Huxley's appropriate words: "One does not battle with drummers." I cannot free myself from the conception that underlying every psychical state there is a physical state, and from that conception follows at once the conclusion that there must be a close association between the succession or the recurrence of certain psychical states, which is what we judge mental and moral characteristics by, and an underlying physical confirmation be it of brain or liver. Hence I put to myself the problem as follows:—Assume the fundamental laws of distribution which we know to hold for the physical characters in man, and see whither they lead us when applied to the psychical characteristics. They must: (*a*) Give us totally discordant results. If so, we shall conclude that these laws have

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[1] For the benefit of the mathematical statistician, I may say that I used the modal group of each sub-array to determine its mean and standard deviation in terms of those of the scale for the whole population.

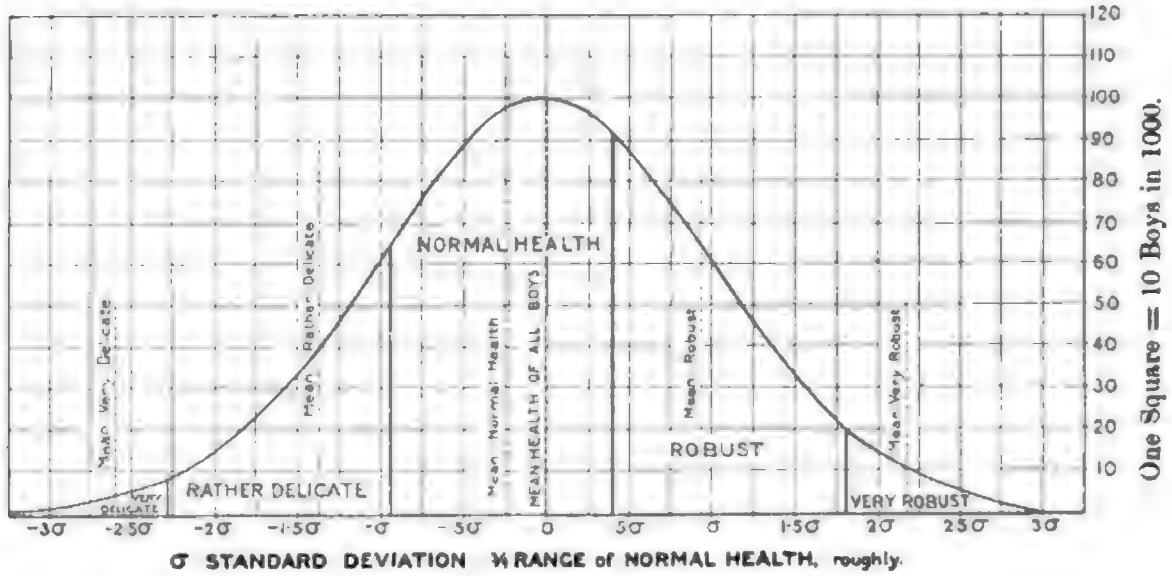

Diagram IX.—Distribution of Health in 1918 School Boys.

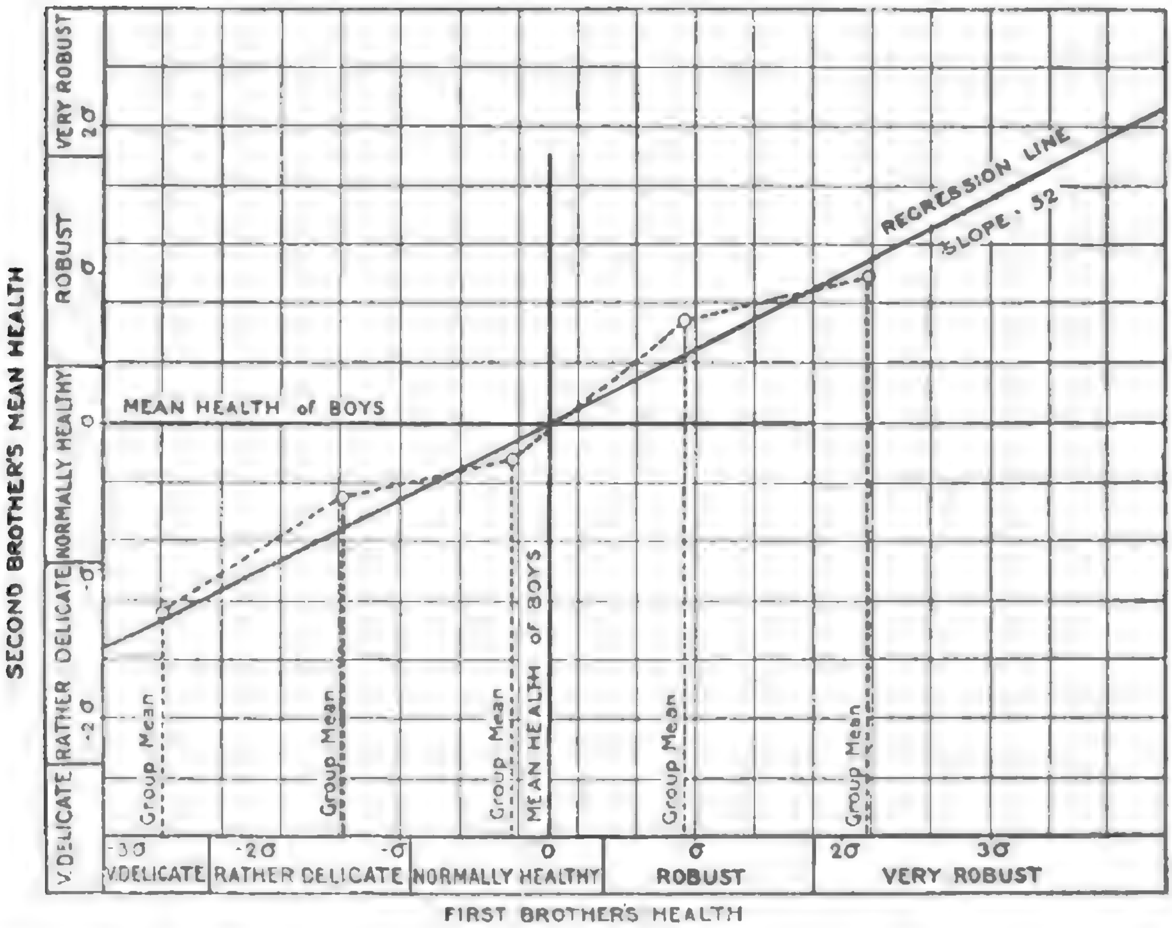

Diagram X.—Resemblance in General Health of 1918 Pairs of Brothers.

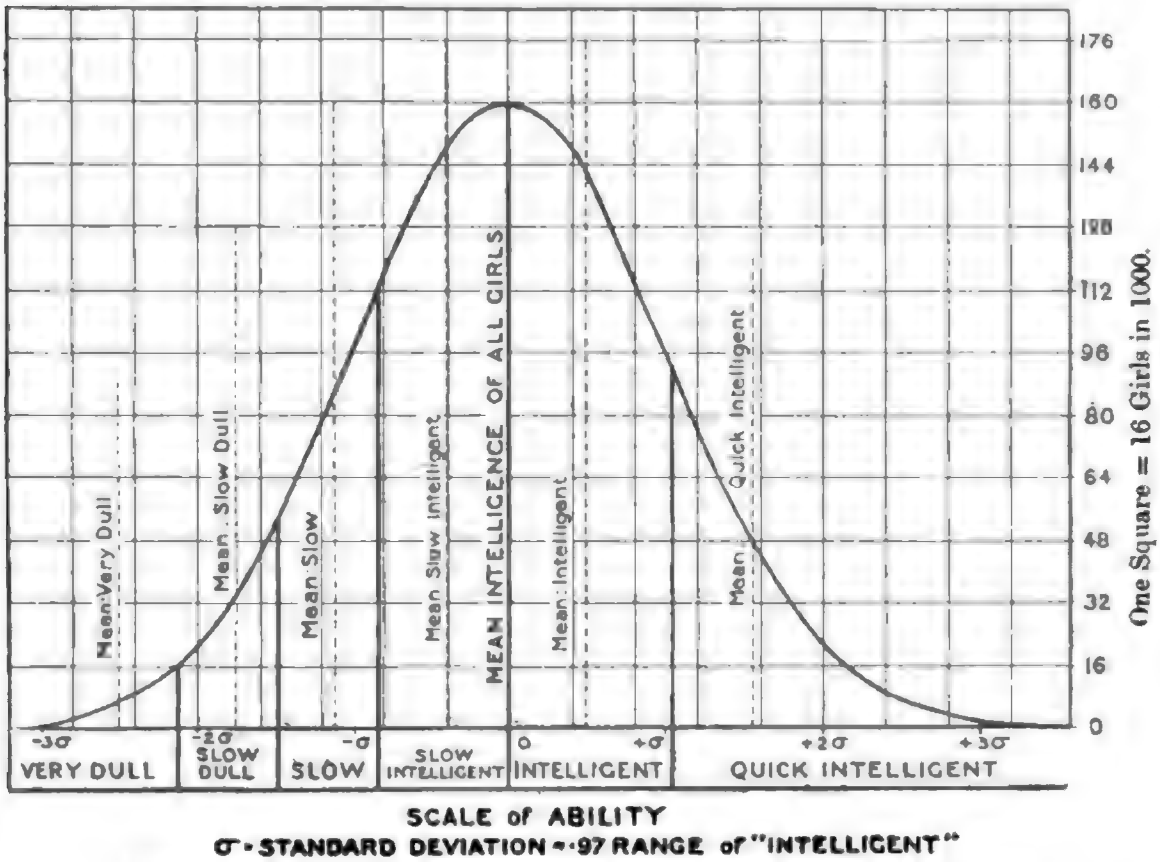

DIAGRAM XI.—DISTRIBUTION OF INTELLIGENCE IN 2014 GIRLS.

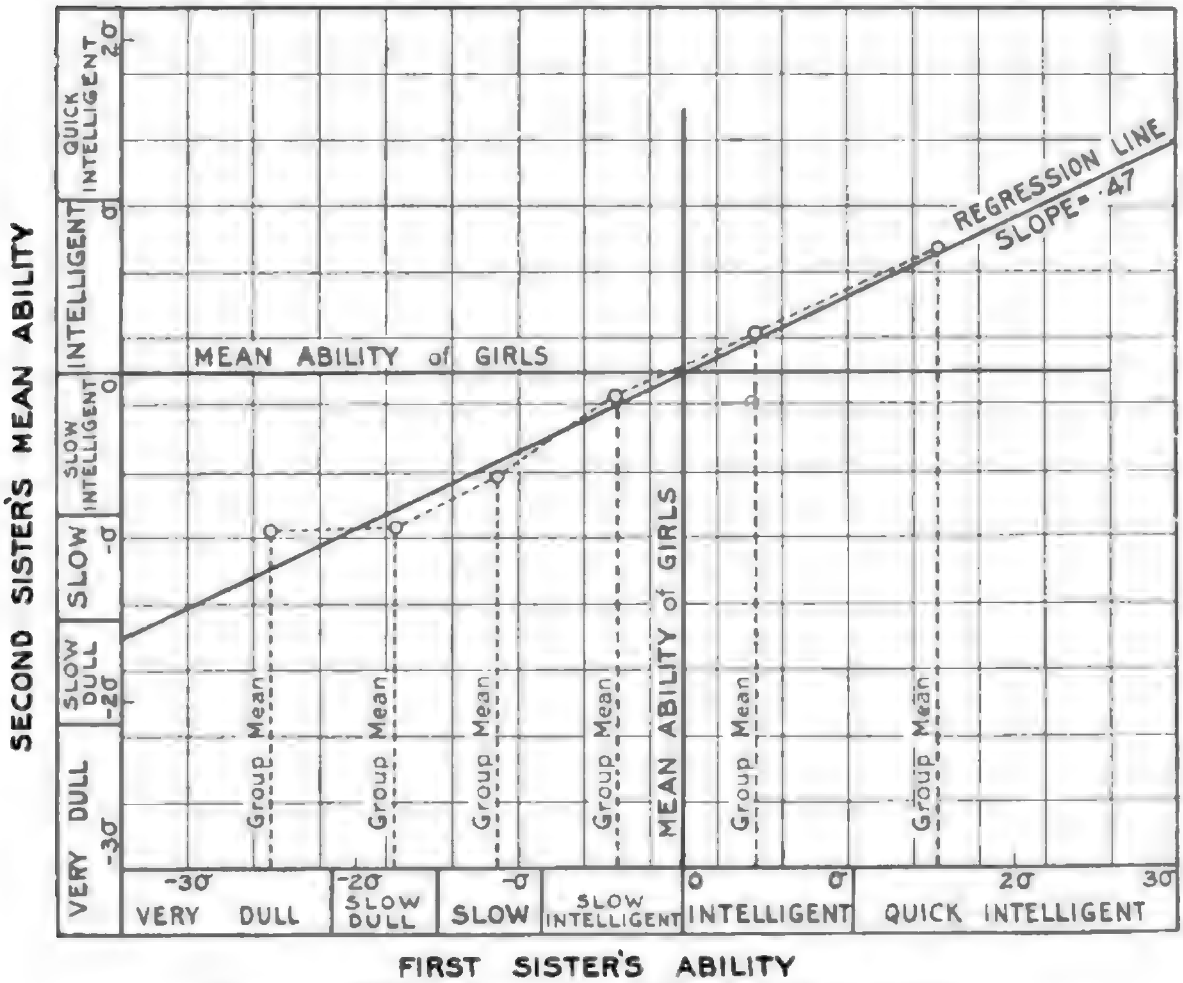

DIAGRAM XII.—RESEMBLANCE OF SISTERS IN ABILITY.

no application to the mental and moral attributes. Or, (*b*) Give us accordant results. If so, we may go a stage further, and ask how these results compare with those for the inheritance of the physical characters: are they more or less or equally subject to the influence of environment? Here are the questions before us. Let us examine how they are to be answered. As an illustration I take *Ability in Girls*. I measured intelligence by the following seven clases. (i) *Quick Intelligent*; (ii) *Intelligent*; (iii) *Slow Intelligent*; (iv) *Slow*; (v) *Slow Dull*; (vi) *Very Dull*, and a quite distinct category; (vii) *Inaccurate-Erratic*. Some explanation of these terms is given in Appendix IA, which contains the general instructions for observation, and the terms themselves were practically formulated by a schoolmaster of considerable pedagogic and psychological experience.

My next stage was to ask two or three different teachers in several schools to apply the classification to 30 to 50 pupils known to each of them. The classifications were made quite independently, often by teachers of quite different subjects, and a comparison of the results showed that 80 to 85 per cent. of the children were put into the same classes by the different teachers, while about 10 per cent. more only differed by one class. This gave one very great confidence not only in the value of this scale, but of other psychical classifications when used by observant teachers. The next stage was to obtain exactly, as in the case of *Health*, a general scale of intelligence.[1]

Diagram XI gives the normal distribution of intelligence in a population of 2014 girls. It is a curious, if a common result of experience, to find that the modal ability is on the borderland between the *Intelligent* and *Slow Intelligent*. We have here for the first time a quantitative scale of intelligence, and we can at once apply it to the problem of the degree of resemblance between sisters as regards ability. Just as in the case of *Health*, all the girls of a given class are taken, say the *Slow Intelligents*, and at the average value of this class, is plotted upon this scale of intelligence, the average value of the intelligence of the sisters of these girls on the same scale. We thus obtain the six points of Diagram XII, all well within the limits of random sampling, lying on the straight line found from the fourfold division of the data. The slope of this line is ·47 or 47, close to 50, in the 100. There can, I think, be small doubt that *Intelligence* or *Ability* follows precisely the same laws of inheritance as *General Health*, and both the same laws as *Cephalic Index*, or any other physical character.

In precisely the manner indicated here all the other physical and psychical characters recorded may be dealt with. But before we sum up our results for the slopes of all the lines thus investigated, it is most essential to make, especially to an anthropological audience, some remarks on the manner in which the individual physical and mental characters have been treated.

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[1] I should say at once that the *Inaccurate-Erratics* turned out a surprisingly small class, a fractional per cent. of the community, and that they were not further dealt with.

(iii.) *Remarks on Individual Characters dealt with.*

Physical Characters.

(A) *Health.*—We have already seen how this was recorded. In order to deduce the correlation two fourfold tables were made. In the one the division was made between *Delicate* and *Normally Healthy*, in the other between *Normally Healthy* and *Strong*. Theoretically the fourfold divisions ought to be made everywhere where possible, and the weighted mean taken of the results to smooth out irregularities, but the labour is too great for practical purposes, and we must content ourselves with a few simple divisions.

(B) *Eye Colour.*—Our division was into light, medium, dark. The eyes corresponding to these classes are stated in the general instructions. See Appendix IA. For practical purposes the scale is one of the intensity of yellow pigmentation.[1] In this case, remembering that "medium" is rather a vague class, the fourfold division was taken at each of the four corners of the medium-medium category and the mean correlation of the four resulting tables taken to represent the actual correlation in eye colour.

(C) *Hair Colour.*—This is a character concerning which we sadly need a combined investigation on the part of a physiologist, a chemist, and an anthropologist. In saying this, I am not forgetting the pioneer work of Mr. H. C. Sorby published in the *Journal* of this Institute.[2] I do not feel perfectly convinced that we have really got to the number of pigments involved. Even if we have, and there be just two, it by no means follows that our nomenclature enables us effectually to separate hair possessing these pigments in various degrees, still less to place in their right position in any scale the cases of blended pigments. Assume by way of illustration *only*, that there existed two pigments, black and red. We might by placing red at one end of the scale and black at the other, obtain a single scale which would really be a double one, *i.e.*, a scale of diminishing amounts of black pigment from one end, and of red from the other. In the one case the fairs are classed with red as marking an absence of black pigment and in the other case with the darks as marking an absence of red. Fourfold divisions of this table would then give the correlation between brethren either in the amount of red pigment or in the amount of black pigment. Unfortunately the observer comes across—besides a very deep red type of hair which seems to be pure red, and which shades, if enough individuals are taken, continuously away from "fair reds"—another red, a "dark red," which I found frequently described as "brown red" or "dark brown red," and which seems to be a blend of the red and dark pigments. The existence of these brown reds seems to me the difficulty of the single scale arrangement. It is on this account that some hair scale makers have placed the reds alongside the browns, but this appears to misplace the "fair reds" and "pure reds." I am at present working on the problem of a practical hair scale, and I am not at all certain that something corresponding to the artist's conception of "value" is not what we want, if we are to use hair colour as a character for investigations about inheritance. I merely refer to this method because I consider these hair colour results somewhat unsatisfactory and subject to revision and reclassification. There is another point also to which I must refer. I have found a distinct growth in children's hair colour with age. This, of course, has been recognized in a general way, but our data supply, as soon as we have settled our scale, the quantitative measure of it. Hence, exactly as in the case of head measurements, we ought really to allow for the growth change in hair before measuring the resemblance of brothers. Allowance for this growth, to judge from the effect of growth in other cases, might easily change the value of the correlation by 10 to 15 per cent. I hope to return to the problems of scale and growth in hair colour; meanwhile I would describe what I have done. The hair correlation tables have been worked out in four different ways, namely, by forming fourfold tables at each corner of the "brown-brown" category. By doing this I have endeavoured to allow for the position of the red-browns, which were classified under reds, *i.e.*, whenever a division comes for the fourfold table between brown and dark, it is immaterial whether the reds are placed beyond the fairs, between fairs and browns, or between browns and darks. The results given for hair are the means of the four correlations found by working out the tables in four different ways. I believe on any system of "value"[1] my result will be approximately correct, but it would still need correction for growth, *i.e.*, a sensible darkening in the fifteen years of life covered by our observations. On the whole, I publish the hair colour results with reservations.

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[1] Blue is to be considered as an absence of pigmentation.

[2] *Journ. Anthr. Inst.*, vol. viii, 1878, pp. 1–14.

(D) *Curliness of Hair.*—Our three categories were smooth, wavy, curly. The results are the means of two computations, first with the division between smooth and wavy, and then with the division between wavy and curly.

(E) *Cephalic Index.*

(F) *Head Length.*

(G) *Head Breadth.*

(H) *Auricular Height.*

The method of investigating the degree of resemblance in these characters has been already referred to. We may note that, in all cases, the order of intensity in resemblance is head breadth, auricular height and head length. I confess to believing that some of this is due to greater difficulty in getting a true head length, than a true breadth or height, but I do not believe that this is the sole source of the divergence. I shall touch on this subject on another occasion when I come to deal with growth of head in children, meanwhile I would say that it appears to me that a pause arises in the growth of head length which is not perceptible, or at least not so perceptible, in the case of the growth of breadth or height. I should not be surprised to find that the on-coming of puberty affects the growth of head length differently from the growth of head breadth or height, and that a comparison for this character of brothers or sisters, one of whom has and the other of whom has not reached the age of puberty, may to some extent affect our results. This influence would not be fully allowed for by growth curves, as the age of puberty, especially in girls, seems to vary largely, even in members of the same family.

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[1] I hope shortly to be able to publish photographic measures of "value" in hair-colour.

(I) *Athletic Power.*—While I have worked with only eight physical and eight mental characters, I have an additional character which it is needful to refer to here, and which it is difficult to class as purely physical. I mean athletic capacity. We may define the athletic individual as one not only keen on sports and games, but as capable in them. This denotes a training and a *mental control* of hand and eye, and approaches psychical efficiency.[1] It might therefore be a problem to determine in which class of characters the athletic should be placed. The results, however, of dealing with athletics are from the standpoint of inheritance abnormally high. An examination of the schedules led me at once to the conclusion that much of this resemblance was wholly spurious. Certain schools, boys' public schools and the larger girls' schools, pride themselves on an athletic reputation; hence two brothers or two sisters at such schools are usually returned as an athletic pair. On the other hand, schools without an athletic reputation are too liable to return the two members of a pair as non-athletic, the teachers having little or no knowledge of the game capacity of their pupils. Hence arises the high value of resemblance in athletic power between the members of a pair of brothers or a pair of sisters. This resemblance is largely, perhaps 40 to 50 per cent., a result of a differentiation between the class of schools in which athleticism is a cult and the class in which it is not—the town or board school with little playground and no game training.

To complete the demonstration of this conclusion we need only turn to the mixed schools, whence our brother-sister pairs are drawn. These schools do not exhibit the athletic cult on the same scale, and we get quite a fair and reasonable value for the resemblance of brothers and sisters in athletic power. To obtain the correlation the fourfold division was taken between the athletic and non-athletic.

Psychical Characters.

(J) *Vivacity.*

(K) *Assertiveness.*

(L) *Introspection.*

(M) *Popularity.*

(N) *Conscientiousness.*

In all these five psychical characters, our schedule admitted of only three possibilities, *i.e.*, the cross must be placed in the space allotted to either contrasted character, or on the dividing line between, marking a "betwixt and between" state of affairs. Our tables were prepared with a ninefold system of categories including a "betwixt" column and row. The "betwixts" were not, however, very numerous, and they were then halved or quartered as the case might be into the adjacent groups to save the great labour of working with four fourfold tables and averaging the four results.

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[1] This is confirmed by the high correlations I have found to exist between athletic capacity and many psychical characters.

(O) *Temper.*—Our categories were: *Quick-tempered*, *Good-natured*, and *Sullen*, with the usual system of "betwixts." In a very few instances sullen children were recorded who had occasional outbursts of quick-temper. In this classification accordingly, some of the like difficulties arise that we have noted in the case of hair-colour. To surmount these, first a division was made between quick temper and good temper, and the correlation found from the fourfold table thus reached. Secondly, the sullen were thrown in with the quick, and the whole classed as *Bad tempered* in contrast to *Good tempered*. In the first case we are measuring a certain phlegmatic character, in the second rather the extent of self-control. But the two divisions led to very sensibly the same results. Thus for girls we have the correlations:—

Division between Quick and Good temper: ·49.
Division into Good and Bad (Quick and Sullen) tempers: ·50.

The mean of the two results was then taken as a measure of correlation in the matter of temper.

(P) *Ability.*—We have already (p. 196) discussed this character at some length. All that seems necessary to add is that the division for the fourfold table was taken between *Intelligent* and *Slow Intelligent*.

(Q) *Handwriting.* Some persons may be inclined to question whether this character is properly placed in the psychical class. Is it really a largely muscular characteristic? Personally I do not think it desirable to draw very rigid lines between the physical and psychical, and the present inquiry has much strengthened that opinion. But we have gone far further with handwriting than is obvious on the face of this paper, which is confined to inheritance; and, without anticipating results yet to be published, I would say that, quite contrary to my expectation, very sensible correlations exist between the psychical characters and the handwriting, which on the other hand has only very moderate or zero correlations with the physical characters. In school children at any rate, temper, probity and assertiveness are all correlated with the character of the handwriting, and I have little hesitation myself therefore in including it with the psychical rather than the physical group.

These remarks on the individual characters dealt with may enable the reader to understand something of the method adopted in analysing our material. They will at any rate suggest that many points have been considered and investigated which cannot be even touched upon here, but which have aided us in our classifications and general treatment.[1]

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[1] For example upwards of 120 correlations between physical characters, between psychical characters and between physical and psychical characters have been worked out, tending to throw right on the interrelationships of these supposed widely differentiated sides of the human character.

(iv.) *Comparison of the Values found for the Inheritance of the Physical and Psychical Characters in Man.*

Thus far my whole object has been to describe the sources of my material, and to throw some light, perchance, on the new methods we have adopted in classification and computation. I have spent a considerable time over this latter topic, because to the anthropologist of the older school, the biometrician too often appears as a juggler in figures. It is impossible, perhaps, to help this at present, when the biometrician is introducing a new calculus, which cannot be learnt without hard work, and which cannot be handled without training. We are not endeavouring to discredit anthropology, but to furnish such branches of it as anthropometry and craniology with new tools—a little sharp-edged to the uninitiated who handle them incautiously—but which will raise anthropometry and craniology in the future into the category of the more exact sciences. Such must be my excuse for describing so fully, and yet, I fear, so ineffectually, the processes we have adopted. It is another point to ask you to admit that I came to this inquiry without prejudice. I expected *a priori* to find the home environment largely affecting the resemblance in moral qualities of brothers and sisters. I expected to find a spurious emphasis of the inheritance of the moral qualities owing to this environment. Putting any thought of prejudice on one side, accept for a moment

TABLE III.

Inheritance of the Physical Characters.

School Observations on Children.

Character.	Correlation.		
	Brothers.	Sisters.	Brother and Sister.
Health	·52	·51	·57
Eye Colour	·54	·52	·53
Hair „	·62	·57	·55
Hair Curliness	·50	·52	·52
Cephalic Index	·49	·54	·43
Head Length	·50	·43	·46
Head Breadth...	·59	·62	·54
Head Height	·55	·52	·49
Mean	·54	·53	·51
Athletic Power	·72	·75	·49

the methods adopted, and listen—regardless of the drummers—to the broad results of the inquiry. You have in Table I (see p. 187) the mean of the resemblance in physical characters of brothers and sisters from my records of family measurements. You have in Table III the mean of the physical measurements of our school records—16 series in the first, 24 series in the latter. I venture to say that remembering the possible slips in measurement and in classification, there is not the slightest doubt that those two series absolutely confirm each other, and give a mean degree of resemblance of nearly ·5 between children of the same parents for physical characters. How much of that physical resemblance is due to home environment? You might at once assert that size of head and size of body are influenced by nurture, food, and exercise. It is quite true; even curliness may be subject to home influences. But what is the broad effect of such environment on our coefficients of heredity? Can any possible home influence be brought to bear on cephalic index, on hair colour, or eye colour? I fancy not, and yet these characters are within broad lines inherited exactly like the quantities directly capable of being influenced by nurture and exercise. I am compelled to conclude that the environmental influence on physical characters, however great in some cases, is not to the first approximation a great disturbing factor when we consider coefficients of fraternal resemblance in man. I do not believe it to be at all comparable with the irregularities that arise from random sampling and occasional carelessness in measurement or in appreciation of character.

TABLE IV.

Inheritance of the Mental Characteristics.

School Observations on Children.

Character.	Correlation.		
	Brothers.	Sisters.	Brother and Sister.
Vivacity	·47	·43	·49
Assertiveness	·53	·44	·52
Introspection	·59	·47	·63
Popularity	·50	·57	·49
Conscientiousness	·59	·64	·63
Temper	·51	·49	·51
Ability	·46	·47	·44
Handwriting	·53	·56	·48
Mean	·52	·51	·52

Now turn to Table IV of the degree of resemblance in the mental and moral characters. What we do find? Perhaps slightly more irregularity in the values than in the case of the physical characters. The judgment required is much finer; and the classification is much rougher. Let me frankly admit the difficulties of the task, both for observers and computers. I will lay no weight whatever, if you like, on the second place of decimals. But what is the obvious conclusion? Why, that the values of the co-efficient again cluster round ·5. If anything the average degree of resemblance for the psychical is rather less than for the physical, it certainly is not greater. Personally I would lay not a grain's weight on the difference.

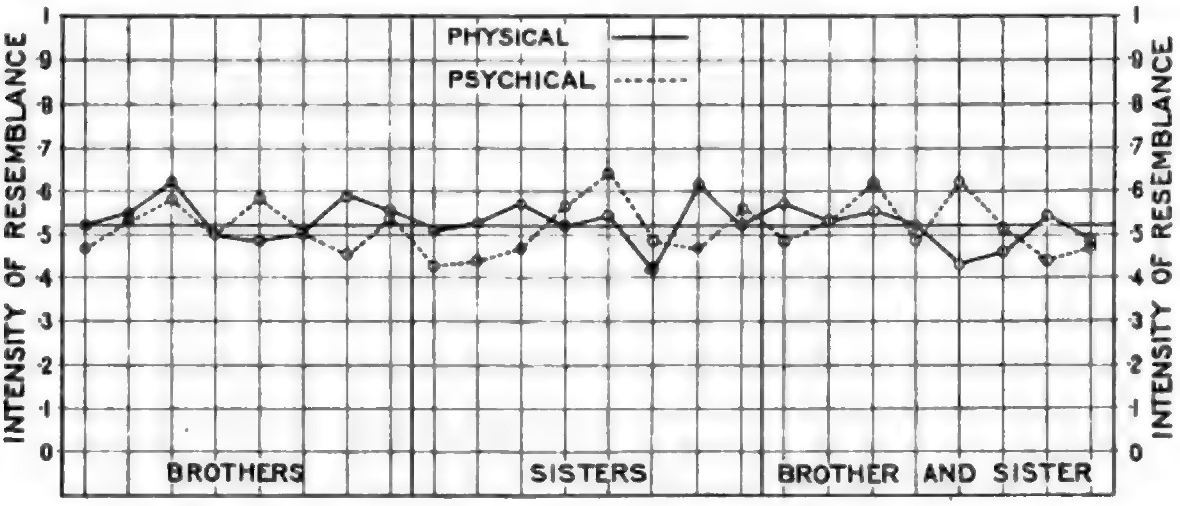

Diagram XIII.—Comparison of Resemblance for Physical and Psychical Characters.

I have illustrated the whole result in Diagram XIII. The two lines representing physical and psychical qualities go bobbing up and down, and cutting and re-cutting one another. No wise man, however, would venture to assert that one or other is sensibly uppermost, or that any of those rises or falls have real significance. We are forced absolutely to the conclusion that the degree of resemblance of the physical and mental characters in children is one and the same.

It has been suggested that this resemblance in the psychical characters is compounded of two factors, inheritance on the one hand and training or environment on the other. If so, you must admit that inheritance and environment make up the resemblance in the physical characters. Now these two sorts of resemblance being of the same intensity, either the environmental influence is the same in both cases, or it is not. If it is the same, we are forced to the conclusion that it is insensible, for it cannot influence eye colour. If it is not the same, then it would be a most marvellous thing, that with varying degrees of inheritance, some mysterious force always modifies the extent of home influence, until the resemblance of brothers or sisters is brought sensibly up to the same intensity! Occam's razor will enable us at once to cut off such a theory.

We are forced, I think literally forced, to the general conclusion that the physical and psychical characters in man are inherited within broad lines in the same manner, and with the same intensity. The average home environment, the average parental influence is in itself part of the heritage of the stock and not an extraneous and additional factor emphasising the resemblance between children from the same home.

But we are not yet at the end of our conclusions. By assuming our normal distribution for the psychical characters we have found, not only self-consistent results—linear regression, for example, as in the case of the inheritance of intelligence, but we have found the *same* degree of resemblance between physical and psychical characters. That *sameness* surely involves something additional. *It involves a like heritage from parents.* The degree of resemblance between children and parents for the physical characters in man may be applied to the degree of resemblance between children and parents for psychical characters. We inherit our parents' tempers, our parents' conscientiousness, shyness and ability, even as we inherit their stature, forearm and span.

At what rate is that? I show you a table (*see* Table V), which represents our present knowledge of parental inheritance in man,[1] and in other species. I venture to say that—within broad lines—the physical characters are inherited at the same rate in man and in the lower forms of life. The resemblance of parent and offspring is again roughly ·5.

What conclusion flows upon us irresistibly from the inspection of such a table? Why, that the physical characters are not features, which differentiate man from

TABLE V.

Parental Inheritance in Different Species.

Species.	Character.	Mean value.	No. of pairs used.	Source.	Remarks.
Man	Stature	·506	4886	*Biometrika*, vol. ii, p. 358.	—
"	Span	·459	4873	ditto.	—
"	Forearm	·418	4866	ditto.	—
"	Eye colour	·495	4000	*Phil. Trans.*, vol. 195, p. 106.	—
Horse	Coat colour	·522	4350	*Phil. Trans.*, vol. 195, p. 93.	—
Basset Hound ..	Coat colour	·524	823	*R. S. Proc.* vol. 66, p. 154.	Dams only used.
Greyhound	Coat colour	·507	9279	Unpublished data for two characters.	Dams and sires both used.
Aphis (*Hyalopterus Trirhodus*) ..	Right antenna / Frontal breadth	·439	368	*Biometrika*, vol. i, 139.	Ratios only taken to free from growth factor.
Daphnia *Magna* ..	Protopodite / Body length	·466	96	*R. S. Proc.*, vol. 65, 1899.	

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[1] Taken from a memoir: "On the Laws of Inheritance in Man. I. Inheritance of the Physical Characters." *Biometrika*, vol. ii, p. 379.

the lower types of life. If they are inherited like man's physical characters, if they are inherited even as the protopodite of the water flea, what reason is there for demanding a special evolution for man's mental and moral side? We look upon the universe and wonder. The man of science probes a little deeper into nature than the ordinary mortal, but the deeper he probes, the greater his wonder, for the more complex and mysterious the universe appears. Do you wish to draw the line of mystery at living forms? Look at the sky on a clear night, and realise that while astronomers have *described* the motions of a tiny corner of the universe, they have not the least explanation of how and why those motions are taking place.

Nay, take the least, apparently most inert particle of metal, and remember that if modern physical views are correct, millions, probably billions of small corpuscles are in relative motion within it, with a complexity and yet probably with an underlying order as great as in the starry universe, even if on a totally different scale. Remember that we have scarcely touched the fringe of a description of those motions, and that their *why* is as inexplicable to us as the motions of the celestial bodies themselves. Note all this, and ask yourselves if there be less mystery in the motions of non-living than of living things. You may call a man who would link up the motion of living to non-living things a materialist. But the materialist in no way lessens the endless mystery of the universe. He knows not what matter is, why it moves, or how he comes to be conscious of its motion. He is but fulfilling the task of science, the linking of mystery to mystery, by bringing them under one common wider conception of the ultimately inexplicable. So it is when we pass from the lower living forms to man. If we see that his physical development is closely allied to brute development, we link mystery to mystery in a common description—a law if you like—but it removes no grain of the ultimate mystery of why life is there, and why it develops. Lastly, turning to the psychical character of man, to some the greatest of all mysteries, we link it up to the physical. We see the man, not only physically, but morally and mentally, the product of a long line of ancestry. We realise that evolution and selection play no greater, and play no less a part in the production of the psychical character than in the production of the physique of man. Once fully realise that the psychic is inherited in the same way as the physical, and there is no room left to differentiate one from the other in the evolution of man. Realise all this, and two mysteries have been linked into one mystery, but the total mystery is no less in magnitude, and no more explicable than it was before. We know not why living forms vary, nor why either physical or psychical characters are inherited, nor wherefore the existence at all of living forms, and their subjection to the great principle of selective evolution. We have learnt only a law common to the physical and the psychical; we have not raised the one or debased the other, because in a world where the ultimate source of change is utterly inexplicable, whether you strive to perceive it through matter like a physicist, through the lower living forms like the biologist, or through man like the anthropologist, all terminology like higher and lower is futile. Where the mystery is absolute in all cases, there can be no question of grade.

But I would not leave you with a mere general declaration that all is mystery, that scientific ignorance of the ultimate is profound. Rather I would emphasize what I have endeavoured to show you to-night, that the mission of science is not to explain but to bring all things, as far as we are able, under a common law. Science gives no real explanation, but provides comprehensive description. In the narrower field it has to study how its general conceptions bear on the comfort and happiness of man. Herein, I think, lies especially the coming function of anthropology. Anthropology has in the first place to study man, to discover the sequence of his evolution from his present comparative stages and from his past history. But it cannot halt here; it must suggest how those laws can be applied to render our own human society both more stable and more efficient. In this function it becomes at least the handmaiden of statecraft, if indeed it were not truer to call it the preceptor of statesmen.

If the conclusion we have reached to-night be substantially a true one, and for my part I cannot for a moment doubt that it is so, then what is its lesson for us as a community? Why simply that geniality and probity and ability may be fostered indeed by home environment and by provision of good schools and well equipped institutions for research, but that their origin, like health and muscle, is deeper down than these things. They are bred and not created. That good stock breeds good stock is a commonplace of every farmer; that the strong man and woman have healthy children is widely recognized too. But we have left the moral and mental faculties as qualities for which we can provide amply by home environment and sound education.

It is the stock itself which makes its home environment, the education is of small service, unless it be applied to an intelligent race of men.

Our traders declare that we are no match for Germans and Americans. Our men of science run about two continents and proclaim the glory of foreign universities and the crying need for technical instruction. Our politicians catch the general apprehension and rush to heroic remedies. Looking round impassionately from the calm atmosphere of anthropology, I fear there really does exist a lack of leaders of the highest intelligence, in science, in the arts, in trade, even in politics. I do seem to see a want of intelligence in the British merchant, in the British professional man and in the British workman. But I do not think the remedy lies solely in adopting foreign methods of instruction or in the spread of technical education. I believe we have a paucity, just now, of the better intelligences to guide us, and of the moderate intelligences to be successfully guided. The only account we can give of this on the basis of the result we have reached to-night is that we are ceasing as a nation to breed intelligence as we did fifty to a hundred years ago. The mentally better stock in the nation is not reproducing itself at the same rate as it did of old; the less able, and the less energetic, are more fertile than the better stocks. No scheme of wider or more thorough education will bring up in the scale of intelligence hereditary weakness to the level of hereditary strength. The only remedy, if one be possible at all, is to alter the relative fertility of the good and the bad stocks in the community. Let us have a census of the effective size of families among the intellectual classes now and a comparison with the effective size of families in the like classes in the first half of last century. You will, I feel certain, find, as in the case of recent like censuses in America, that the intellectual classes are now scarcely reproducing their own numbers, and are very far from keeping pace with the total growth of the nation. Compare in another such census the fertility of the more intelligent working man with that of the uneducated hand labourer. You will, I again feel certain, find that grave changes have taken place in relative fertility during the last forty years. We stand, I venture to think, at the commencement of an epoch, which will be marked by a great dearth of ability. If the views I have put before you to-night be even approximately correct, the remedy lies beyond the reach of revised educational systems; we have failed to realize that the psychical characters, which are, in the modern struggle of nations, the backbone of a state, are not manufactured by home and school and college; they are bred in the bone; and for the last forty years the intellectual classes of the nation, enervated by wealth or by love of pleasure, or following an erroneous standard of life, have ceased to give us in due proportion the men we want to carry on the ever-growing work of our empire, to battle in the fore-rank of the ever intensified struggle of nations.

Do not let me close with too gloomy a note. I do not merely state our lack. I have striven by a study of the inheritance of the mental and moral characters in man to see how it arises, and to know the real source of an evil is half-way to finding a remedy. That remedy lies first in getting the intellectual section of our nation to realize that intelligence can be aided and be trained, but no training or education can *create* it. You must breed it, that is the broad result for statecraft which flows from the equality in inheritance of the psychical and the physical characters in man.

APPENDIX 1A.

[*Any Teacher willing to give assistance in these observations—an assistance which will be duly acknowledged in the final publication of results—is requested to communicate with* Professor KARL PEARSON, F.R.S., *University College, London.*]

GENERAL DIRECTIONS FOR FILLING UP DATA PAPERS OF COLLATERAL HEREDITY.[1]

1. The object of this investigation is two-fold :
   - (i) To ascertain the degree of resemblance, mental and physical, between children of the same parents.
   - (ii) To discover, if possible, whether there is any relationship between the external shape of the head and a teacher's estimate of the general grade of ability of the pupil.

Co-operators are warned *ab initio* that no inferences whatever can be drawn from individual instances or from a small series of measurements. The numerical quantities to be determined are small, and it is only when large masses of observations have been collected from many quarters and have been reduced that reliable inferences can be drawn.

2. The measurements and estimates are to be made on :
   - (i) Pairs of brothers (white data paper).
   - (ii) Pairs of sisters (pink data paper).
   - (iii) Pairs of brothers and sisters (blue data paper).

Care must be taken that the right coloured data paper is selected.

The names of the measured are only required in case there should be need for the verification of any entry, and they will be treated as strictly confidential. Initials, in fact, may be used where it seems desirable, if the observer keeps a key to them for the purpose of reference should reference be required.

The observer should have known *well* both members of the pair measured for at least six months, and, if possible, for a much longer period. The classification is purposely made rather wide and indefinite in order that there may be less hesitation in classifying. What is needed is the general impression of a teacher who has carefully observed his or her pupils.

For both physique and ability it is very desirable that the observer should consult, where it is possible, one or more colleagues before filling up the data paper.

To give some confidence in the scales adopted, I may remark that in response to my appeal in the *Journal of Education*, I received details of some 150 boys and girls tested for ability by three observers independently (language, science, and mathematical teachers) and belonging to half-a-dozen different schools. The agreement in classification was complete in more than 80 per cent. of cases, and only differed by as much as two classes in about five per cent. of cases.[2] This degree of accordance is sufficient for the present statistical purposes.

3. I. *Physique.* In making the record, attention should be paid not only to appearance, energy, and athletic qualities, but to irregularity of attendances owing to ill-health, frequency of visits to school-infirmary, etc.

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[1] The quantitative laws of heredity, such as we have reached at present, do not apply to individual cases, but only to the averages of large numbers. It is important to insist on this, because more than one of my helpers on hearing the results of a particular research has seemed disappointed, remarking that the law does not hold for the family X or the brothers Y.

[2] Even this amount of divergence would probably have disappeared after a consultation with regard to the individuals classified.

II. *Ability.* (*a*) Some account of this scale will be found in the *Journal of Education* for September, 1898, which it might be well for the observer to examine. The following may help to show the significance of the terms:

Very Dull. Capable of holding in their minds only the simplest facts, and incapable of perceiving or reasoning about the relationship between facts.

Slow Dull. Capable of perceiving relationship between facts in some few fields with long and continuous effort; but not generally, or without much external assistance.

Slow. Very slow progress generally, but with time and continual care progress will be made.

Slow Intelligent. Slow generally, although possibly more rapid in certain fields. Quite sure of knowledge when once acquired.

Intelligent. Ready to grasp and capable of perceiving facts in most fields; capable of good progress without much effort.

Quick Intelligent. Very bright and quick both in perception and in acquirement, and this not only of customary, but of novel, facts. Ready to reason rightly about things on purely self-initiative.

Inaccurate-Erratic. Capable of perceiving facts, but quick to form erroneous conclusions about them, illogical and erratic in reasoning.

(*b*) *Handwriting.* If possible, in addition to this classification, get the pair under investigation to write the last lines of Lord Macaulay's *Lay of Horatius*, with their own signatures on the back of the data paper.

(*c*) *Work.* If the individual be good at several subjects, put a cross against all these in the first row; as well as the strongest subject in the next row; if the individual be good at none, make no entry in the first row, but only in the second row, where *best at* must be interpreted in this case as *least bad at.* The individual should be asked his favourite subject and favourite game. Mathematics covers Arithmetic and Geometry; Descriptive Science includes Botany, Experimental Physics, Physiography, etc.

III. *Head Measurements.* These are to be made with the head-spanner, full directions for the use of which are given in its case.

IV. *Hair.* Comment seems unnecessary.

V. *Eyes.* Light covers blue of all shades, light grey, very light green; medium covers dark grey, green, light chestnut, orange and grey combined; dark covers dark chestnut, light and dark brown, black.

VI. *Relative Characters.* This entry is needful for the numerical reduction of the statistics in those cases in which both brothers have been given the *same* class, otherwise no use should be made of it.

If the characteristic be equally strong in both, write equal, instead of putting a cross.

VII. If the alternative characteristics are neither possessed in a marked degree, place the cross on the dividing line.

VIII. *General Remarks.* Under this heading it may be useful *occasionally* to note any marked physical or mental characteristic of the pair. Care should, however, be taken not to lay greater stress on points of resemblance than on points of diversity.

4. It is most desirable that the head-spanners should not be kept longer than four to six weeks, in order that they may be sent on as rapidly as possible to other schools. They should be returned with the stamped and addressed labels. Any school anthropometrical laboratory desiring to procure a head-spanner of the present pattern, can do so at a cost of 19*s.* 6*d.*, from the Cambridge Scientific Instrument Company, Carlyle Road, Cambridge.

The spanners need to be carefully handled. Should any part be broken or lost the box with the spanner should be returned at once, in order that it may be repaired without delay and again sent out for use.

Any special inquiries should be addressed to me, at University College, London.

KARL PEARSON.

APPENDIX IB.

DATA PAPER FOR COLLATERAL HEREDITY INVESTIGATIONS.

B. SISTER-SISTER SERIES.
(Whole, not half sisters.)

No. in whole series.
(Not to be filled in.)

Please return this Paper to Professor KARL PEARSON, F.R.S., University College, London.

School :

Observer :

No. in School Series

Date :

Place a cross against the class of each sister under as many headings as possible, except under III and VIII. Please read first the General Directions.

	ELDER SISTER.	YOUNGER SISTER.
Name		
Age		
District of Home		

I. PHYSIQUE :

	Very Strong.	Strong.	Normally Healthy.	Rather Delicate.	Very Delicate.	Athletic.	Non-Athletic.
ELDER SISTER ...							
YOUNGER SISTER ...							

II. ABILITY : (*a*) *General Scale.*

	Quick Intelligent.	Intelligent.	Slow Intelligent.	Slow.	Slow Dull.	Very Dull.	Inaccurate-Erratic.
ELDER SISTER ...							
YOUNGER SISTER ...							

(*b*) HANDWRITING :
(*See Back.*)

	Very Good.	Good.	Moderate.	Poor.	Bad.	Very Bad.
ELDER SISTER ...						
YOUNGER SISTER ...						

(*c*) WORK :

		Classics.	Modern Languages.	History.	Mathematics.	Descriptive Science.	Drawing.	Singing, Music.
ELDER SISTER	Good at ...							
	Best at ...							
	Likes best							
YOUNGER SISTER	Good at ...							
	Best at ...							
	Likes best							

(*d*) GAMES OR PASTIMES :

	ELDER SISTER.	YOUNGER SISTER.
Likes		
Good at ...		

III. HEAD MEASUREMENTS :

	Length.	Breadth	Height.	*a*.	*b*.	*c*.
ELDER SISTER ...						
YOUNGER SISTER ...						

(*a*), (*b*), (*c*), Indices (not to be filled in).

IV. HAIR :

	Red.	Fair.	Brown.	Dark.	Jet Black.	Smooth.	Wavy.	Curly.
ELDER SISTER								
YOUNGER SISTER								

V. EYES :

	Light.	Medium.	Dark.
ELDER SISTER ...			
YOUNGER SISTER ...			

VI. RELATIVE CAPABILITIES : This is *only* to be filled in in those cases wherein the two sisters fall into the same class.

	Physique, stronger in	More Athletic.	Ability, greater in	Handwriting, better in	Hair, darker in	Eyes, darker in
ELDER SISTER ...						
YOUNGER SISTER ...						

VII. CHARACTER, ETC. :

	Noisy	Quiet	Self-conscious	Unself-conscious	Self-assertive	Shy.	Conscientiousness		Popular	Unpopular	Temper.		
							Keen	Dull			Quick.	Good natured.	Sullen.
ELDER SISTER ...													
YOUNGER SISTER ...													

VIII. GENERAL REMARKS. Add here any striking features of resemblance or dissimilarity in the sisters.

ELDER SISTER	
YOUNGER SISTER	

[On the back of the Schedule spaces were arranged for samples of the handwriting.]

APPENDIX II.

Observers and Schools contributing to the Data upon which this Memoir is based.

Aberdeen, A. N. Meldrum ; Ferry Hill Public School, J. D. Anderson. *Aberuthven* School, J. M. S. Math. *Acocks Green*, Wellesbourne House School, O. Sunderland. *Aldenham* School, F. B. Stead. *Alresford*, Swanaton School, W. L. W. Eyre. *Barnard Castle*, County School, F. Hodson. *Bakewell*, Lady Manner's School, H. Martin. *Berwick*, Berwickshire High School, H. S. Mabbatt. *Birmingham*, King Edward's School, F. M. McCarthy ; King Edward's School, C. J. Wood ; King Edward's School for Girls, M. J. Nimmo and A. L. Parmenter. *Bradford-on-Avon*, Winsley and Turley National School, Alice E. Griffiths. *Bridgend*, County School, W. A. Whittan. *Bridgewater*, St. John's School, E. M. Lucas. *Brighton*, Brighton and Hove High School for Girls, R. Mayhew. *Bristol*, Two-Mile Hill Board School, A. F. Bateman. *Buckhurst Hill*, Oakfield School, E. Linder. *Burghead* Public School, M. Brenner. *Burnley*, Higher Grade and Science School, F. H. Hibber. *Cardenden*, Craigderran School, David Rorie. *Cardiff*, Eleanor Street Boys' School, A. C. Badcoe ; Intermediate School for Boys, A. Abbatt. *Carlisle*, High School for Girls, A. Beavor and G. Whiting. *Caterham*, Congregational School, F. W. G. Foat. *Cheltenham*, Ladies' College, Catherine E. Berridge. *Chesterfield*, Hipper Street School, S. Steel. *Clacton-on-Sea*, Clacton College, H. Picton. *Clapham*, High School for Girls, M. Cave and Mrs. Woodhouse. *Congleton*, St. James' School, W. F. Warburton. *Cork*, High School for Girls, H. A. Martin. *Darlington*, Bowes School, D. L. Smith. *Dereham*, Swanton Morley National School, J. Lewton Brain. *Dewsbury* Grammar School, G. Rowland. *Dulwich*, Alleyn's School, J. V. H. Coates ; Dulwich College, H. Brereton Baker ; Dulwich Village Evening Continuation School, C. T. Hunt. *Dollar* Public School, J. Begg. *Dundee*, Monikie School, P. Grant. *Durham* School, J. T. Johnson. *Duffus* Public School, J. W. Garrigall. *Epsom*, The College, S. R. Browne. *Ferry Hill*, Bishopton School, T. G. Frankton. *Edinburgh*, Fettes College, C. J. N. Fleming and W. I. Sargent. *Fochaber*, Speymouth Public School, A. Geddie. *Folkestone*, Sidney Street Board School, J. A. Hugill. *Glossop*, Arundel School, R. H. Dickinson. *Grangemouth*, Grange Higher Grade Science School, F. W. Maryon. *Grantham*, North Rauncebу Church School, A. W. M. Drew and W. H. Baily. *Great Ayton*, Friends' School, F. R. Arundel. *Guernsey*, Island of (many schools), E. W. Adair and S. Butler. *Halifax* Higher Board School, W. Dycke. *Harrogate*, Western Board School, J. W. Hammond. *Haslemere*, Fernhurst Board School, H. Watts. *Hassocks*, Clayton School, L. H. Beecher-Shand. *Handsworth*, Grammar School, S. R. Hart. *Haywards Heath*, National Schools, A. J. Mouncher. *Hinckley*, Elementary School, O. C. Hirst. *Hornsey*, Board School, J. C. Hudson. *Huntley*, Corse Public School, A. C. Rathway. *Ilkeley*, Grammar School, F. T. Cramphorn. *Isle of Wight*, Chorley School, G. E. Jeans. *Keighley*, Kiedwich School, T. Appleby. *Keswick*, Keswick School, S. Horton Barnard. *Landewednack*, Board School, J. Carwardine. *Leek*, High School, T. L. Warrington. *Leighton Buzzard*, Linslade School, G. F. Andrill. *Lerwick*, Widows' Asylum, J. Allen. *Leyton*, Elementary School, F. J. Chittenden ; Technical Institute, H. Hills. *Lisburn*, Ulster Provincial School, W. D. Braithwaite. *Llandebie* School, T. Mathews. *Liverpool*, High School for Girls, E. Canning ; Liverpool Institute, W. S. Saul. *Londonderry*, Fahan School, W. A. Dickson. *Lyme Regis*, National School, J. Radford. *London*, University College School, J. L. Paton and Staff ; Whitechapel Road Foundation School, F. Dixon ; Priory Grove Board School, W. R. Suddeley ; Fernhead Road School, J. C. Bedwell ; Goswell Road, St. Thomas', Charterhouse, W. W. Woodward ; New Southgate, High School, J. Fairquire ; Chelsea, Cook's Ground Board School, D. H. Hodge ; Walworth, Michael Faraday School, T. M. Upfield ; Titchborne Street, St. John's Girls' School, A. McGilhvray ; Radnor Street Wesleyan School, J. W. Parkinson ; Fernham Street Girls' Board School, S. Carter ; Dulwich, High School for Girls, M. Barwell ; Highbury, High School for Girls, M. Minasi ; Notting Hill, High School for Girls, T. F. Grünbaum ;

Camden Town, North London Collegiate School for Girls, S. Bryant; Limehouse, St. Anne's Schools, C. J. Carter; Hampstead, Soldiers' Daughters' Home, C. D. Fawcett; Morley College, J. Denton; Notting Hill School, M. M. Adamson; Limehouse, Higher Grade Board Schools, Thomas Street, J. Crabtree; Old Charton Girls' School, A. Baker; Hampstead, King Alfred's School, J. Russell; Christ's Hospital, C. E. Browne. *Manchester*, Hulme Grammar School, C. H. Crombie; High School for Girls, C. Coignou; Withington, Lady Barn House School, C. Herford. *Mansfield*, Brunt's Technical School, C. E. Stacey. *Margate*, New Cross Street Board School, E. Parker. *Markinch*, Star Public School, Wm. McLachlan. *Marston Green*, Cottage Homes, W. J. Rees. *Merthyr Tydfil* School, M. J. Swift. *Milford Haven* County School, L. Jones. *Morpeth*, Netherwitton Board School, J. Anderson. *Newark*, Beacon Hill School, W. A. Greames. *Newbury* School, C. Cecil Fry; Donnington School, Mrs. Bell. *Newcastle-on-Tyne*, Central High School for Girls and other schools, E. W. N. Williams. *Newton Stewart*, Ewart High School, C. S. Dougall. *Norwich*, Angel Road Board School, B. H. Barber. *Nottingham*, Berridge Road Girls' Board School, A. N. Stone; Morley House, B. Smith; Waverley School, H. T. Facon. *Oxford*, High School for Girls, E. Macdonald; Abbey Road School, Miss Sheppard. *Pembroke Dock*, County School, G. W. West. *Pemberton*, St. John's Schools, J. T. Milward. *Peterborough*, Fitzwilliam School, G. E. Holmes. *Peterhead* Academy, J. Don. *Petersfield*, Bedales School, T. J. Garstang. *Pinner*, Woodridings School, Z. Haes. *Polperro* School, F. H. Perry-Coste. *Pontefract*, Ackworth School, G. E. Bell. *Pontypridd*, Wesleyan School, W. H. Rees. Mill Street Higher School, J. Farr. *Portsmouth*, High School for Girls, M. M. Adamson. *Pwlheli*, County School, J. W. Evans. *Reigate*, Church High School, E. E. Ardington. *Richmond* (Surrey), County School, A. E. Buckhurst; Richmond Hill School, H. D. Greig. *Royston*, Littlington School, W. C. Whitehead. *Saffron Walden*, Friends' School, E. W. Sawdon. *St. Leonards-on-Sea*, Silverhill Girls' School, E. H. Woodd. *Sheffield*, Westbourne School, Miss Sims. *Shrewsbury*, Criggian School, R. Brack; Murivane High School for Girls, G. M. Wise. *South Shields* School, R. Sanderson. *Southwold*, St. Felix School, C. M. Sant. *Spennymore* School, H. Askew. *Spilsby*, Spendleby School, A. Teare. *Stranraer*, Ardwell School, D. Thomson. *Swansea* Grammar School, E. H. Tripp. *Sydenham* School, R. Lulham. *Taunton*, King's College, E. B. Vincent. *Tavistock*, Kelly College, P. L. Andrews. *Tottenham* High School, L. F. Ushendoor. *Upholland* Grammar School, D. L. Rennard. *Warrington*, Penketh School, W. E. Brown. *Wellington* College, G. E. Blundell and H. P. Fitzgerald. *West Ham*, Castor House Board School, R. Symes. *Whitehaven*, Girls' School, W. Blackmore. *Winchester* College, W. B. Croft. *Wimbledon*, High School for Girls, Miss Knight. *Windlesham* Board School, J. Simms. *Winscombe*, Sicot School, B. Lean. *Woodford*, Wanstead College, J. B. Martin. *Wragby* School, T. Dixon-Spain. *York*, High School for Girls, M. Leader. *Yeovil*, Kington School, E. H. Davison. *Yiewsley*, St. Mathew's Schools, J. J. Wade. *Ystalyfera*, County School, A. B. Gully; and other schools.

Appendix III.—Detailed Tables.

I. Physical Characters.

HEALTH.

A (i). *Brother-Brother.*

First Brother.

		Very strong.	Strong.	Normally healthy.	Rather delicate.	Very delicate.	Totals.
Second Brother.	Very strong	24	31	11·5	4	—	70·5
	Strong	31	342	163·75	65·75	3	605·5
	Normally healthy	11·5	163·75	588·5	137·25	6	907
	Rather delicate	4	65·75	137·25	95	11	313
	Very delicate	—	3	6	11	2	22
	Totals	70·5	605·5	907	313	22	1918

A (ii). *Sister-Sister.*

First Sister.

		Very strong.	Strong.	Normally healthy.	Rather delicate.	Very delicate.	Totals.
Second Sister	Very strong....	44·5	38·5	17·5	8·5	—	109
	Strong	38·5	306·5	154·5	74	5	578·5
	Normally healthy	17·5	154·5	411	201·5	19	803·5
	Rather delicate	8·5	74	201·5	166	28·5	478·5
	Very delicate	—	5	19	28·5	15	67·5
	Totals	109	578·5	803·5	478·5	67·5	2037

A (iii). *Brother-Sister.*

Brother.

		Very strong.	Strong.	Normally healthy.	Rather delicate.	Very delicate.	Totals.
Sister.	Very strong	46	15	7	4	--	72
	Strong	35	174·5	64	22·5	1	297
	Normally healthy	17	85·25	191·75	50·5	3	347·5
	Rather delicate	9	34·25	69·75	48	3	164
	Very delicate	1	2	1	2·5	6	12·5
	Totals	108	311	333·5	127·5	13	893

EYE COLOUR.

B (i). *Brother-Brother.*

First Brother.

		Light.	Medium.	Dark.	Totals.
Second Brother.	Light	558	190	81·5	829·5
	Medium	190	426·5	122	738·5
	Dark	81·5	122	228·5	432
	Totals....	829·5	738·5	432	2000

B (ii). *Sister-Sister.*

First Sister.

		Light.	Medium.	Dark.	Totals.
Second Sister.	Light	438·5	196·5	71·5	706·5
	Medium	196·5	598	136	930·5
	Dark	71·5	136	257·5	465
	Totals....	706·5	930·5	465	2102

B (iii.) *Brother-Sister.*

Brother.

		Light.	Medium.	Dark.	Totals.
Sister.	Light	206·5	66·5	33	306
	Medium	86	208·25	46·25	340·5
	Dark	28	53·25	104·25	185·5
	Totals....	320·5	328	183·5	832

HAIR COLOUR.

C (i).

Brother-Brother.

First Brother.

Second Brother.	Red.	Fair.	Brown.	Dark.	Jet black.	Totals.
Red	30·5	23	16	12	—	81·5
Fair	23	416	158	67·75	·25	665
Brown	16	158	394	98·25	8·25	674·5
Dark....	12	67·75	98·25	328·5	19	525·5
Jet black	—	·25	8·25	19	10	37·5
Totals	81·5	665	674·5	525·5	37·5	1984

C (ii).

Sister-Sister.

First Sister.

Second Sister.	Red.	Fair.	Brown.	Dark.	Jet black.	Totals.
Red	31	22	19	14	1	87
Fair	22	474	195·5	47·5	—	739
Brown	19	195·5	474	162·5	4·5	855·5
Dark....	14	47·5	162·5	206	6·5	436·5
Jet black	1	—	4·5	6·5	4	16
Totals	87	739	855·5	436·5	16	2134

C (iii).

Brother-Sister.

Brother.

Sister.	Red.	Fair.	Brown.	Dark.	Jet black.	Totals.
Red	12	9·5	12·5	5	—	39
Fair	10·5	198·5	73	29·5	—	311·5
Brown	4	72	138·5	57	3	274·5
Dark....	5	32·5	52·5	91	10	191
Jet black	—	1	3	4	5	13
Totals	31·5	313·5	279·5	186·5	18	829

CURLINESS OF HAIR.

D (i).

Brother-Brother.

First Brother.

		Smooth.	Wavy.	Curly.	Totals.
Second Brother.	Smooth	1556·5	111·5	34·5	1702·5
	Wavy	111·5	134·5	20	266
	Curly	34·5	20	11	65·5
	Totals....	1702·5	266	65·5	2034

D (ii).

Sister-Sister.

First Sister.

		Smooth.	Wavy.	Curly.	Totals.
Second Sister.	Smooth	937·5	190·5	98	1226
	Wavy	190·5	213·5	52	456
	Curly	98	52	76	226
	Totals....	1,226	456	226	1908

D (iii).

Brother-Sister.

Brother.

		Smooth.	Wavy.	Curly.	Totals.
Sister.	Smooth	395·5	24	12	431·5
	Wavy	106·5	33	11	150·5
	Curly	49	11	17	77
	Totals....	551	68	40	659

E (i).

Cephalic Index. Brother-Brother.

First Brother.

Second Brother.

	67—68	68—69	69—70	70—71	71—72	72—73	73—74	74—75	75—76	76—77	77—78	78—79	79—80	80—81	81—82	82—83	83—84	84—85	85—86	86—87	87—88	88—89	89—90	90—91	91—92	Totals.
67—68	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
68—69	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
69—70	—	—	2	—	1	—	—	1	2	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	8
70—71	1	1	—	—	2	2	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8
71—72	—	—	1	2	—	2	2	2	5	2	4	2	—	1	1	—	1	—	1	—	—	—	—	—	—	26
72—73	1	—	—	2	2	2	3	1	3	2	2	1	3	1	—	—	—	—	—	—	—	—	—	—	—	23
73—74	—	—	—	1	2	3	6	5	7	10	7	3	2	1	1	1	—	—	—	—	—	—	—	—	—	49
74—75	—	—	1	—	2	1	5	6	11	8	11	13	7	6	1	3	1	1	—	—	—	—	1	—	—	78
75—76	—	—	2	1	5	3	7	11	16	18	24·5	34	15	5	4	8	2	1	—	—	—	—	—	—	—	156·5
76—77	—	—	—	—	2	2	10	8	18	20	24	40·5	23	17	6	6	1	2	—	2	—	—	—	—	—	181·5
77—78	—	—	—	—	4	2	7	11	24·5	24	38	39	27·5	19·5	13	10	10	3	3	—	1	—	—	—	—	236·5
78—79	—	—	—	—	2	1	3	13	34	40·5	39	50	36·5	25·5	20	12	6	6	2	2	1	—	—	—	—	293·5
79—80	—	—	—	—	—	3	2	7	15	23	27·5	36·5	34	23	21	14·5	12	1	3	3	—	1	1	—	—	227·5
80—81	—	—	—	—	1	1	1	6	5	17	19·5	25·5	23	26	24	8·5	15	4	4	1	—	—	—	—	—	181·5
81—82	—	—	1	—	1	—	1	1	4	6	13	20	21	24	26	17	8	9	2	—	—	1	1	—	—	156
82—83	—	—	1	—	—	—	1	3	8	6	10	12	14·5	8·5	17	10	15	15	5	2	1	—	—	1	—	130
83—84	—	—	—	—	1	—	—	1	2	1	10	6	12	15	8	15	8·5	6·5	3	4	—	—	—	—	—	93
84—85	—	—	—	—	—	—	—	1	1	2	3	6	1	4	9	15	6·5	4·5	3	1	—	1	—	—	—	58
85—86	—	—	—	—	1	—	—	—	—	—	3	2	3	4	2	5	3	3	2	1	1	1	—	—	—	31
86—87	—	—	—	—	—	—	—	—	—	2	—	2	3	1	—	2	4	1	1	4	3	—	—	—	—	23
87—88	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	1	—	—	1	3	—	—	—	—	—	7
88—89	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	1	1	—	—	—	—	—	—	4
89—90	—	—	—	—	—	—	—	1	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	1	4
90—91	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
91—92	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1
Totals	3	2	8	8	26	23	49	78	156·5	181·5	236·5	293·5	227·5	181·5	156	130	93	58	31	23	7	4	4	1	1	1982

E (ii).

Cephalic Index. Sister-Sister.

First Sister.

Second Sister.

	62·5—63·5	63·5—64·5	64·5—65·5	65·5—66·5	66·5—67·5	67·5—68·5	68·5—69·5	69·5—70·5	70·5—71·5	71·5—72·5	72·5—73·5	73·5—74·5	74·0—75·5	75·5—76·5	76·5—77·5	77·5—78·5	78·5—79·5	79·5—80·5	80·5—81·5	81·5—82·5	82·5—83·5	83·5—84·5	84·5—85·5	85·5—86·5	86·5—87·5	87·5—88·5	88·5—89·5	89·5—90·5	90·4—91·5	91·5—92·5	Totals.
62·5—63·5	—	1	—	—	1	—	—	—	·5	1·5	·5	1·5	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7
63·5—64·5	1	2	—	1·5	—	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	·5	—	—	—	—	—	—	8
64·5—65·5	—	—	1	1·5	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5	—	—	—	—	—	—	4
65·5—66·5	—	1·5	1·5	—	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6
66·5—67·5	1	—	1	—	—	—	—	2	—	1	2	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
67·5—68·5	—	—	—	—	—	1	·5	—	—	—	1	—	·5	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5
68·5—69·5	—	—	—	—	—	·5	2	2	—	—	2	—	·5	1	1	1	—	—	1	—	1	—	—	—	—	—	—	—	—	—	12
69·5—70·5	—	—	—	—	2	—	2	2	1	2·5	2	4·5	2	1	2	3	·5	1	1	2	—	—	—	—	—	—	—	—	—	—	28·5
70·5—71·5	·5	—	—	1	—	—	—	1	4	4	1·25	2·75	2	—	1	3	·5	—	—	—	—	—	—	—	—	—	—	—	—	—	21
71·5—72·5	1·5	1	—	—	1	—	—	2·5	4	4	4·75	4·75	6	9	2	5	·5	2	—	—	2	—	—	—	—	—	—	—	—	—	50
72·5—73·5	·5	—	—	1	2	1	2	2	1·25	4·75	2	3	1·5	8·5	9	4	6·5	1·5	2	4	1	—	—	1	1	—	—	—	—	—	59·5
73·5—74·5	1·5	1	—	—	1	—	—	4·5	2·75	4·75	3	10	12	10·5	4·25	5·75	1·5	1·5	·5	3	—	—	1	—	—	—	—	—	—	—	68·5
74·5—75·5	1	—	—	1	—	·5	·5	2	2	6	1·5	12	14	14·5	6·25	11·75	11	4	2·5	3	1	2	—	—	—	—	—	—	—	—	96·5
75·5—76·5	—	1	—	—	1	1	1	1	—	9	8·5	10·5	14·5	21	26	16·5	18	8·5	8·5	9	5	1·5	—	—	—	—	—	—	—	—	161·5
76·5—77·5	—	—	—	—	—	1	1	2	1	2	9	4·25	6·25	26	27	16·5	34·5	21·5	14	15	6·5	1	1	—	—	—	—	—	—	1	190·5
77·5—78·5	—	—	—	—	—	—	1	3	3	5	4	5·75	11·75	16·5	16·5	43	29	25·5	27·5	18·75	6·25	4	1	3·25	1·25	—	—	—	—	—	226
78·5—79·5	—	—	—	—	—	—	—	·5	·5	·5	6·5	1·5	11	18	34·5	29	42	31·5	16·5	16·25	11·25	9·5	1·5	·25	·25	—	—	—	—	—	231
79·5—80·5	—	—	—	—	—	—	—	1	—	2	1·5	1·5	4	8·5	21·5	25·5	31·5	37	13·75	22·25	17	4	11	—	2	1	—	—	—	—	205
80·5—81·5	—	—	—	—	—	—	1	1	—	—	2	·5	2·5	8·5	14	27·5	16·5	13·75	32·5	19·25	9	7·5	6·5	2·5	—	—	—	·5	·5	·5	166
81·5—82·5	—	—	—	—	—	—	—	2	—	—	4	3	3	9	15	18·75	16·25	22·25	19·25	23	6	6·5	6·5	3	—	1	—	·5	—	—	159
82·5—83·5	—	—	—	—	—	—	1	—	—	2	1	—	1	5	6·5	6·25	11·25	17	9	6	8	5	3·5	3	1	—	—	—	—	·5	87
83·5—84·5	—	—	—	—	—	—	—	—	—	—	—	—	2	1·5	1	4	9·5	4	7·5	6·5	5	3	1·5	3	—	2	1	—	—	·5	52
84·5—85·5	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	1	1·5	11	6·5	6·5	3·5	1·5	2	2	1	1	1	—	—	1	41·5
85·5—86·5	—	·5	·5	—	—	—	—	—	—	—	1	—	—	—	—	3·25	·25	—	2·5	3	3	3	2	2	—	—	—	—	1	—	22
86·5—87·5	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1·25	·25	2	—	—	1	—	1	—	—	—	—	—	—	—	6·5
87·5—88·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	2	1	—	—	—	—	—	—	—	5
88·5—89·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	2
89·5—90·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5	·5	—	—	—	—	—	—	—	—	—	—	1
90·5—91·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5	—	—	—	—	1	—	—	—	—	—	—	1·5
91·5—92·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	·5	—	·5	·5	1	—	—	—	—	—	—	—	3·5
Totals ...	7	8	4	6	9	5	12	28·5	21	50	59·5	[illegible]·5	96·5	161·5	190·5	226	231	205	166	159	87	52	41·5	22	6·5	5	2	1	1·5	3·5	1936

E (iii).

Cephalic Index. Brother-Sister.

Brother.

Sister.	70—71	71—72	72—73	73—74	74—75	75—76	76—77	77—78	78—79	79—80	80—81	81—82	82—83	83—84	84—85	85—86	86—87	87—88	88—89	89—90	90—91	Totals.
68—69	—	—	—	—	·5	·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
69—70	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
70—71	—	—	—	1	—	—	—	·5	2	—	—	—	—	—	—	—	—	—	—	—	—	3·5
71—72	—	1	—	1	2	3	3	1	·5	—	—	—	—	—	—	—	—	—	—	—	—	11·5
72—73	—	—	1	4	—	1	3	1·5	1·5	—	1	—	—	—	—	—	—	—	—	—	—	13
73—74	1	—	2	4·5	—	2	·5	2	—	—	—	2	—	—	—	—	—	—	—	—	—	14
74—75	—	1·5	·5	4·5	3	4	7	3	4	4	2	—	2	—	·5	—	—	—	—	—	—	36
75—76	—	2·5	·5	2·5	4	6·5	7	4	8·25	6·25	5	1·5	1·5	1	·5	—	—	—		—	—	51
76—77	·5	—	4·5	2·5	3	6·5	11·25	9	8·75	10	9	3	1	—	—	1	—	—	—	—	—	70
77—78	·5	1	1·5	2	5	13·5	7·75	12	14·5	3·25	4·25	3·25	3·5	1·5	—	1	—	—	—	—	—	74·5
78—79	1	1	—	3·5	4	7·5	10·5	16·5	14	14·5	12·25	6·75	5·5	4·5	3	1	—	1	—	—	—	106·5
79—80	1	—	—	1	1·5	5	5·5	10	18·5	10	9	7	5·5	6	1	1	1	1	—	—	—	84
80—81	—	—	1	3	1·5	2	2·5	9·5	14	13·25	12·25	10·5	4·5	2·5	2	2	1	—	—	—	—	81·5
81—82	—	—	—	—	1	2	3·5	6·5	8	6·75	9·25	3·5	6	3·5	3	—	—	1	—	—	—	54
82—83	—	—	—	1·5	1·5	3	3·5	1·5	7·25	1·75	4·5	6	2	3·5	3	1	1	—	—	—	1	42
83—84	—	—	—	—	2	2·5	3·5	4	2·75	4·75	2	7·5	·5	2	3	·5	1	—	—	—	—	36
84—85	—	—	—	—	1·5	1	·5	1	1·5	4·5	2	3·5	3	—	2	·5	—	—	—	—	—	22
85—86	—	—	—	—	—	—	1	—	—	1	4	2	·5	1	—	—	—	—	1	·5	—	11
86—87	—	—	—	—	—	—	1	—	—	—	—	4	1	—	—	—	1	1	1	·5	—	9·5
87—88	—	—	—	—	—	—	1	—	—	—	—	—	—	1	·5	·5	—	—	—	—	—	3
88—89	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	2
89—90	—	—	—	—	—	—	—	1	—	1	—	—	1	1	—	—	—	—	—	—	—	4
Totals ...	5	7	11	31	30·5	61	73	83	105·5	81	76·5	61·5	37·5	27·5	18·5	8·5	5	4	3	1	1	732

F (i).

Head Length reduced to 12 years. Brother-Brother.

First Brother.

Second Brother.	*163·5*	*165·5*	*167·5*	*169·5*	*171·5*	*173·5*	*175·5*	*177·9*	*179·5*	*181·5*	*183·5*	*185·5*	*187·5*	*189·5*	*191·5*	*193·5*	*195·5*	*197·5*	*199·5*	*201·5*	*203·5*	*205·5*	Totals.
163·5	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
165·5	—	—	·5	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	2·5
167·5	—	·5	1	1	—	—	·5	·5	—	—	—	·5	—	—	—	—	—	—	—	—	—	—	4
169·5	1	—	1	2	1·5	4	3	4	1	1	2	1·5	2	—	—	—	—	—	—	—	—	—	24
171·5	—	—	—	1·5	4	5·5	4·5	9·5	2	5	2	3	3	1	1	—	1	1	—	—	—	—	44
173·5	—	—	—	4	5·5	2	5·5	15·5	2·5	6	6·5	3	1·5	—	—	—	1·5	—	—	—	—	—	53·5
175·5	—	—	·5	3	4·5	5·5	7	5	12	18·5	16·5	7·5	4·25	3·75	1	—	·5	1	—	—	—	—	90·5
177·5	1	1	·5	4	9·5	15·5	5	17	24	21	20·5	10·75	8	4·25	4·5	2·5	—	1	—	—	—	—	150
179·5	—	1	—	1	2	2·5	12	24	32	25	29	28·5	15	4·5	5·5	1	2	—	—	—	—	1	186
181·5	—	—	—	1	5	6	18·5	21	25	24	42·5	24·75	24·75	12·25	17·75	4·5	2	1	—	—	—	—	230
183·5	—	—	—	2	2	6·5	16·5	20·5	29	42·5	53·5	35	35·5	19·75	16·75	5·5	4·5	2·5	2·5	1	—	—	295·5
185·5	—	—	·5	1·5	3	3	7·5	10·75	28·5	24·75	35	28·5	31	23·25	24	7·25	4·5	2	1·5	1	—	1	238·5
187·5	—	—	—	2	3	1·5	4·25	8	15	24·75	35·5	31	28	23·75	17·75	13	6·5	2	·5	—	—	1	217·5
189·5	—	—	—	—	1	—	3·75	4·25	4·5	12·25	19·75	23·25	23·75	33	26·75	15·5	9·75	7	4	1	—	—	189·5
191·5	—	—	—	—	1	—	1	4·5	5·5	17·75	16·75	24	17·75	26·75	23	9·75	10·75	4	2	·5	1	—	166
193·5	—	—	—	—	—	—	—	2·5	1	4·5	5·5	7·25	13	15·5	9·75	16	4·5	6	3·5	—	—	—	89
195·5	—	—	—	—	1	1·5	·5	—	2	2	4·5	4·5	6·5	9·75	10·75	4·5	5	5·5	2·5	1	—	—	61·5
197·5	—	—	—	—	1	—	1	1	—	1	2·5	2	2	7	4	6	5·5	3	·5	1·5	—	—	38
199·5	—	—	—	—	—	—	—	—	—	—	2·5	1·5	·5	4	2	3·5	2·5	·5	—	1·5	—	—	18·5
201·5	—	—	—	—	—	—	—	—	—	—	1	1	—	1	·5	—	1	1·5	1·5	—	1	—	8·5
203·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	—	—	2
205·5	—	—	—	—	—	—	—	—	1	—	—	1	1	—	—	—	—	—	—	—	—	—	3
Totals	2	2·5	4	24	44	53·5	90·5	150	186	230	295·5	238·5	217·5	189·5	166	89	61·5	38	18·5	8·5	2	3	2114

F (ii).

Head Length reduced to 12 years. Sister-Sister.

First Sister.

Second Sister.

	159·5	*161·5*	*163·5*	*165·5*	*167·5*	*169·5*	*171·5*	*173·5*	*175·5*	*177·5*	*179·5*	*181·5*	*183·5*	*185·5*	*187·5*	*189·5*	*191·5*	*193·5*	*195·5*	*197·5*	*199·5*	*201·5*	*203·5*	Totals.
159·5	—	—	—	—	1	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
161·5	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	2
163·5	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	1	—	—	—	—	—	—	3
165·5	—	—	—	5	2·5	3	2	—	4	4	3	1	2·5	·5	—	—	—	—	—	—	—	—	—	27·5
167·5	1	—	—	2·5	2	3·5	4	4	7·5	10	2	1	—	1	—	1	—	1	—	—	—	—	—	40·5
169·5	—	—	—	3	3·5	5	8·25	10·25	3	3	5·5	3	5	·5	3·5	—	—	—	—	—	—	—	—	53·5
171·5	2	—	—	2	4	8·25	21·5	9·25	8·5	13·5	10·5	5·5	7·5	5	1	—	1·5	1	1	—	—	—	—	102
173·5	—	—	—	—	4	10·25	9·25	11	17	22·5	19	10·5	11	5·5	4·5	1·5	·5	·5	—	1	—	—	—	128
175·5	—	—	—	4	7·5	3	8·5	17	38	34	24·5	18	6·5	5·5	4·5	6	—	2	—	—	—	—	—	179
177·5	—	1	—	4	10	3	13·5	22·5	34	25	33·5	38·5	28	15	7	4·5	3	1	—	1	—	—	—	244·5
179·5	—	—	—	3	2	5·5	10·5	19	24·5	33·5	41	36·5	31	20	19	6·5	1	1	1	—	—	—	—	255
181·5	—	—	—	1	1	3	5·5	10·5	18	38·5	36·5	33	32·5	18·5	24	3·5	6	3	5	—	—	—	—	239·5
183·5	—	—	1	2·5	—	5	7·5	11	6·5	28	31	32·5	26	28·5	23·5	10·5	5	2·5	2·5	—	—	—	—	223·5
185·5	—	—	1	·5	1	·5	5	5·5	5·5	15	20	18·5	28·5	23	19	16	4·5	2·5	6	—	1	1	—	174
187·5	—	1	—	—	—	3·5	1	4·5	4·5	7	19	24	23·5	19	15	12·25	5·25	2	3·5	3	2	—	—	150
189·5	—	—	—	—	1	—	—	1·5	6	4·5	6·5	3·5	10·5	16	12·25	15·5	5·25	2·5	1	—	—	—	—	86
191·5	—	—	1	—	—	—	1·5	·5	—	3	1	6	5	4·5	5·25	5·25	2	2	—	—	—	—	—	37
193·5	—	—	—	—	1	—	1	·5	2	1	1	3	2·5	2·5	2	2·5	2	—	—	—	—	·5	·5	22
195·5	—	—	—	—	—	—	1	—	—	—	1	5	2·5	6	3·5	1	—	—	—	1	—	—	—	21
197·5	—	—	—	—	—	—	—	1	—	1	—	—	—	—	3	—	—	—	1	—	—	—	—	6
199·5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	—	—	3
201·5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	·5	—	—	—	—	—	1·5
203·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5	—	—	—	—	—	·5
Totals	3	2	3	27·5	40·5	53·5	102	128	179	244·5	255	239·5	223·5	174	150	86	37	22	21	6	3	1·5	·5	2002

F (iii).

Head Length reduced to 12 years. Brother-Sister.

Brother.

Sister.	*163·5*	*165·5*	*167·5*	*169·5*	*171·5*	*173·5*	*175·5*	*177·5*	*179·5*	*181·5*	*183·5*	*185·5*	*187·5*	*189·5*	*191·5*	*193·5*	*195·5*	*197·5*	*199·5*	*201·5*	*203·5*	*205·5*	Totals.
159·5	—	1	·5	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·5
161·5	—	·5	·5	—	—	—	—	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—	4
163·5	—	·5	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·5
165·5	—	1	—	1·75	1·75	2	1	1	1	—	1	—	—	3	—	—	—	—	—	—	—	—	13·5
167·5	—	1	—	·25	2·25	3	1	1	1·5	3·5	4	3	2	—	—	—	—	—	—	—	—	—	22·5
169·5	1	2	1	2	—	—	2	4·5	2·5	4	2	4	1	1	—	—	—	—	1	—	—	—	28
171·5	—	2	—	—	4	3·5	4·5	4·75	1·75	1·5	4·5	4	4·5	—	1	—	—	—	—	—	—	—	36
173·5	—	—	—	·5	3·5	5	4·5	5·75	7·75	9	8	5	4	2·5	2·5	·5	—	—	—	—	1	—	59·5
175·5	—	—	—	1	2	1	6·5	7·5	12·5	16	15·5	9·25	6·75	6	5	2·5	—	—	1	—	—	—	92·5
177·5	—	—	—	·5	1·5	5	3	10	16	11	13	10·75	11·75	12	2	4·5	—	—	—	—	—	—	101
179·5	—	—	—	—	1	4	5	3·5	9·25	18·25	15·5	22	9	9	2·5	4	3	·5	1·5	—	—	1	109
181·5	—	—	—	—	1	2	·5	5	5·75	8·25	16·25	14·75	10·5	11	1·5	1·25	·25	1	1	—	—	—	80
183·5	—	—	—	1	2	1·5	1	5	6·5	7·75	9·5	14·25	9·5	14·5	5	5·25	2·75	·5	—	—	—	—	86
185·5	—	—	—	—	1	2	1	1	4·5	1·75	2·75	12·5	11	9	3·5	4	3	1·5	—	—	—	—	58·5
187·5	—	—	—	—	—	—	—	—	1	1	2·75	3·75	5·5	10	6	3	1·5	1·5	1·5	—	—	—	37·5
189·5	—	—	—	—	—	—	1	—	1	2	2·75	4·25	2	1·5	4	4	1	1	·5	—	—	—	25
191·5	—	—	—	—	1	—	1	—	—	—	1	1	2	3	1	2·5	2·5	4	·5	—	—	—	19·5
193·5	—	—	—	—	1	—	—	1	—	—	—	1	—	1	1	—	—	·5	—	—	—	—	5·5
195·5	—	—	—	—	—	—	—	—	1	1	1	1	—	—	·5	·5	1	1	—	—	—	—	7
197·5	—	—	—	—	—	—	—	—	—	—	1	—	—	2	—	—	—	—	—	—	1	—	4
Totals	1	8	3	7	22	31	32	52	73	86	100·5	110·5	79·5	85·5	35·5	32	15	11·5	7	0	2	1	795

G (i)

Head Breadth reduced to 12 years. Brother-Brother.

First Brother.

Second Brother.	*122·5*	*124·5*	*126·5*	*128·5*	*130·5*	*132·5*	*134·5*	*136·5*	*138·5*	*140·5*	*142·5*	*144·5*	*146·5*	*148·5*	*150·5*	*152·5*	*154·5*	*156·5*	*158·5*	*160·5*	Totals.
122·5	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
124·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0
126·5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
128·5	—	—	—	2	—	2	1	1	—	2	—	—	—	—	—	—	—	—	—	—	8
130·5	—	—	1	—	10	—	1	6	—	2	—	1	1	—	—	—	—	—	—	—	22
132·5	—	—	—	2	—	4	3	9	2	4	—	1	1	—	—	—	—	—	—	—	26
134·5	1	—	—	1	1	3	6	5	9	7	4	3	2	2	1	2	—	—	—	—	47
136·5	—	—	—	1	6	9	5	4	17	11	10	9	9	2	2	1	—	—	—	—	86
138·5	—	—	—	—	—	2	9	17	14	23	23	18	6	5	4	4	1	1	—	—	127
140·5	—	—	—	2	2	4	7	11	23	46	35	36·5	27·5	22	10	1	1	—	—	—	228
142·5	—	—	—	—	—	—	4	10	23	35	36	45	35·5	32	15	8	2	2	—	—	247·5
144·5	—	—	—	—	1	1	3	9	18	36·5	45	50	39·5	33	23·25	13·25	4·5	·5	·5	1	279
146·5	—	—	—	—	1	1	2	9	6	27·5	35·5	39·5	44	43	29·75	28·25	7·5	—	—	—	274
148·5	—	—	—	—	—	—	2	2	5	22	32	33	43	66	37·5	21·5	20	5	—	1	290
150·5	—	—	—	—	—	—	1	2	4	10	15	23·25	29·75	37·5	36	23·5	8·5	10·5	5	1	207
152·5	—	—	—	—	—	—	2	1	4	1	8	13·25	28·25	21·5	23·5	14	11·5	6·5	2	1	137·5
154·5	—	—	—	—	—	—	—	—	1	1	2	4·5	7·5	20	8·5	11·5	8	3	—	4	71
156·5	—	—	—	—	—	—	—	—	1	—	2	·5	—	5	10·5	6·5	3	2	5	—	35·5
158·5	—	—	—	—	—	—	—	—	—	—	—	·5	—	—	5	2	—	5	4	3	19·5
160·5	—	—	—	—	—	—	—	—	—	—	—	1	—	1	1	1	4	—	3	2	13
Totals	1	0	1	8	22	26	47	86	127	228	247·5	279	274	290	207	137·5	71	35·5	19·5	13	2120

G (ii).

Head Breadth reduced to 12 years. Sister-Sister.

First Sister.

Second Sister.	*113·5*	*115·5*	*117·5*	*119·5*	*121·5*	*123·5*	*125·5*	*127·5*	*129·5*	*131·5*	*133·5*	*135·5*	*137·5*	*139·5*	*141·5*	*143·5*	*145·5*	*147·5*	*149·5*	*151·5*	*153·5*	*155·5*	*157·5*	*159·5*	*161·5*	Totals.
113·5	—	—	—	1	—	—	—	—	·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1·5
115·5	—	—	—	1	—	1	—	—	·5	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·5
117·5	—	—	—	1	1	1	—	—	—	·5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	4·5
119·5	1	1	1	—	1	1	1	—	—	4·5	1	·5	2	—	1	—	—	—	—	—	—	—	—	—	—	15
121·5	—	—	1	1	4	1	1	—	2	—	2·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12·5
123·5	—	1	1	1	1	—	·5	2·5	2·5	1	1·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12
125·5	—	—	—	1	1	·5	4	3·5	1	2	1·5	·75	·25	2	—	—	1	—	—	—	—	—	—	—	—	18·5
127·5	—	—	—	—	—	2·5	3·5	—	1	4	2·5	3·25	2·25	1	—	—	—	—	—	—	—	—	—	—	—	20
129·5	·5	·5	—	—	2	2·5	1	1	5	6	7·5	3·5	4	4·5	2	2	2·5	1·5	1	—	—	—	—	—	—	47
131·5	—	1	·5	4·5	—	1	2	4	6	16	12	8·75	7·75	9	5·5	5·5	3·5	1·5	—	—	—	—	—	—	—	88·5
133·5	—	—	—	1	2·5	1·5	1·5	2·5	7·5	12	11·5	9·75	15·25	9·75	11·75	8	1	1	2	·5	—	—	—	—	—	99
135·5	—	—	—	·5	—	—	·75	3·25	3·5	8·75	9·75	13·5	21·5	21·75	9·75	15·5	5	3	·5	·5	—	—	—	—	—	117·5
137·5	—	—	—	2	—	—	·25	2·25	4	7·75	15·25	21·5	61	36·5	27·75	23·75	8·5	4	1·5	1	—	—	—	—	—	217
139·5	—	—	—	—	—	—	2	1	4·5	9	9·75	21·75	36·5	34	41	38·5	17·5	19	2·5	1	1	—	—	—	—	239
141·5	—	—	1	1	—	—	—	—	2	5·5	11·75	9·75	27·75	41	41·5	41·75	28·5	25	10·5	2	1	·5	—	—	—	250·5
143·5	—	—	—	—	—	—	—	—	2	5·5	8	15·5	23·75	38·5	41·75	50	28	31·5	16·25	4·25	2	—	1	—	—	268
145·5	—	—	—	—	—	—	1	—	2·5	3·5	1	5	8·5	17·5	28·5	28	23	29	15·75	6·25	2·25	1·25	—	1	—	174
147·5	—	—	—	—	—	—	—	—	1·5	1·5	1	3	4	19	25	31·5	29	18	11	6	1·25	·25	—	—	—	152
149·5	—	—	—	—	—	—	—	—	1	—	2	·5	1·5	2·5	10·5	16·25	15·75	11	6	4·5	6	·5	2	1	—	81
151·5	—	—	—	—	—	—	—	—	—	—	·5	·5	1	1	2	4·25	6·25	6	4·5	1	3	·5	—	—	—	30·5
153·5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	2	2·25	1·25	6	3	1	·5	—	—	1	19
155·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5	—	1·25	·25	·5	·5	·5	—	—	—	—	3·5
157·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	2	—	—	—	—	—	—	3
159·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	2
161·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
Totals	1·5	3·5	4·5	15	12·5	12	18·5	20	47	88·5	99	117·5	217	239	250·5	268	174	152	81	30·5	19	3·5	3	2	1	1880

G (iii).

Head Breadth reduced to 12 years. Brother-Sister.

Brother.

Sister.

	122·5	*124·5*	*126·5*	*128·5*	*130·5*	*132·5*	*134·5*	*136·5*	*138·5*	*140·5*	*142·5*	*144·5*	*146·5*	*148·5*	*150·5*	*152·5*	*154·5*	*156·5*	*158·5*	*160·5*	**Totals.**
121·5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
123·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0
125·5	1	—	—	3	—	1	1	1	2	—	—	—	—	—	—	—	—	—	—	—	9
127·5	1	—	—	1	1	1	—	1	·5	—	—	—	1	—	—	—	—	—	—	—	6·5
129·5	—	—	—	1	—	—	5·5	2	1·5	2·5	1	2·5	2	·5	—	—	—	—	—	—	18·5
131·5	—	—	—	·5	—	1	1·5	3	5	7·5	·5	4	1	2·5	—	1	1	1	—	—	29·5
133·5	—	—	—	1	·5	—	9	2·5	9	6	7·5	1·5	3	3	—	—	—	—	—	—	43
135·5	—	—	—	—	1	3	4	6·5	9·5	7·5	8·5	9·5	8·5	2	—	1	—	—	—	—	61
137·5	—	—	—	—	·5	1	4·5	11	8·5	15·5	15	12	8	11·5	2	2	1·5	—	—	—	93
139·5	—	—	—	—	1·5	—	2·5	2·5	7·5	15·5	23	19·5	17	4·5	6·25	4·25	·5	—	1	—	105·5
141·5	—	—	—	1	—	—	—	5·5	8	12·5	21	22	13·5	10	11·25	4·25	2·5	—	—	—	111·5
143·5	—	—	—	·5	1·5	—	2	3·5	5	12·5	10·5	5	9	18	10·5	5	4	1	—	1	89
145·5	—	—	—	—	—	—	—	·5	1	7·5	8	6	14	11	11·5	7·5	4·5	1	4	—	76·5
147·5	—	—	—	—	—	—	—	—	3	2	3·5	4	6·5	14·5	13	5	5	3	1	—	60·5
149·5	—	—	—	—	—	1	—	—	1	·5	1	2	4	7·25	4·25	2·5	1	2	·5	1	28
151·5	—	—	—	—	—	—	—	—	—	—	—	2·5	2	1·25	3·25	·5	2	2	1·5	—	15
153·5	—	—	—	—	—	—	—	—	—	1	—	·5	1	—	1·5	2	1	—	—	—	7
155·5	—	—	—	—	—	—	—	—	—	—	—	1	—	—	·5	—	—	—	—	1	2·5
157·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5	—	—	—	—	·5
159·5	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	·5	—	—	—	—	1·5
Totals ...	2	0	0	8	6	8	30	40	61·5	91·5	99·5	92	90·5	86	64	36	23	10	8	3	759

H (i).

Head Height reduced to 12 years. Brother-Brother.

First Brother.

Second Brother.	*104·5*	*106·5*	*108·5*	*110·5*	*112·5*	*114·5*	*116·5*	*118·5*	*120·5*	*122·5*	*124·5*	*126·5*	*128·5*	*130·5*	*132·5*	*134·5*	*136·5*	*138·5*	*140·5*	*142·5*	*144·5*	*146·5*	Totals.
104·5	—	—	·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·5
106·5	—	—	·5	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	2·5
108·5	·5	·5	—	—	—	—	1	·5	·5	—	—	—	1	—	—	—	—	—	—	—	—	—	4
110·5	—	—	—	1	·5	·5	2	1·5	3·5	·5	1	1	—	—	—	—	—	—	—	—	—	—	11·5
112·5	—	—	—	·5	2	—	2	1	3·5	·5	—	—	1	1	—	—	—	—	—	—	—	—	11·5
114·5	—	—	—	·5	—	2	8·75	4·25	3	4·25	4·25	1	—	·5	1	1	—	·5	—	—	—	—	31
116·5	—	—	1	2	2	8·75	8·5	14·25	10·5	8	8	5	6	4	1·5	·5	1	·5	—	1	—	—	82·5
118·5	—	1	·5	1·5	1	4·25	14·25	17	17	16·25	17·25	15	7	8	3	1·5	—	1	—	—	—	—	125·5
120·5	—	—	·5	3·5	3·5	3	10·5	17	11	20·75	20·75	18·5	13·75	9·25	6·5	4·25	1·25	·5	—	—	—	—	144·5
122·5	—	—	—	·5	·5	4·25	8	16·25	20·75	20·5	26	28·5	20	13·25	8·5	3·5	6	·5	3·5	1	—	—	181·5
124·5	—	—	—	1	—	4·25	8	17·25	20·75	26	33	39·5	31	20·25	13	10·25	3·75	1·5	1·5	2	—	—	233
126·5	—	1	—	1	—	1	5	15	18·5	28·5	39·5	40	37·5	37	26·75	14·75	3	2·5	2	—	—	1	274
128·5	—	—	1	—	1	—	6	7	13·75	20	31	37·5	27	31·25	26·75	12·75	14	3·5	2·5	1·5	—	—	236·5
130·5	—	—	—	—	1	·5	4	8	9·25	13·25	20·25	37	31·25	48	30·75	16·75	13	11·5	5·5	1·5	2	—	253·5
132·5	—	—	—	—	—	1	1·5	3	6·5	8·5	13	26·75	26·75	30·75	23	14·75	11·75	7·25	7·5	1·5	1	1	185·5
134·5	—	—	—	—	—	1	·5	1·5	4·25	3·5	10·25	14·75	12·75	16·75	14·75	10·5	12·25	8·25	5·5	·5	2	—	119
136·5	—	—	—	—	—	—	1	—	1·25	6	3·75	3	14	13	11·75	12·25	9	5·5	6·5	1·25	1·25	—	89·5
138·5	—	—	—	—	—	·5	·5	1	·5	·5	1·5	2·5	3·5	11·57	7·25	8·25	5·5	7	3·5	3·25	1·25	—	58
140·5	—	—	—	—	—	—	—	—	—	3·5	1·5	2	2·5	5·5	7·5	5·5	6·5	3·5	3	—	1	1	43
142·5	—	—	—	—	—	—	1	—	—	1	2	—	1·5	1·5	1·5	·5	1·25	3·25	—	2	—	—	15·5
144·5	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1	2	1·25	1·25	1	—	—	—	8·5
146·5	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	1	—	—	—	3
Totals	·5	2·5	4	11·5	11·5	31	82·5	125·5	144·5	181·5	233	274	236·5	253·5	185·5	119	89·5	58	43	15·5	8·5	3	2114

H (ii).

Head Height reduced to 12 years. Sister-Sister.

First Sister.

Second Sister.	104·5	106·5	108·5	110·5	112·5	114·5	116·5	118·5	120·5	122·5	124·5	126·5	128·5	130·5	132·5	134·5	136·5	138·5	140·5	142·5	144·5	146·5	Totals.
104·5	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	2
106·5	—	—	1	—	—	3	—	—	2	—	1	—	1	—	—	—	—	—	—	—	—	—	8
108·5	—	1	6	—	2	2	5	3	3	—	—	1	—	1	—	—	—	—	—	—	—	—	24
110·5	—	—	—	6	—	8	6·5	4·5	3·5	3	1	1	—	—	—	—	—	—	—	—	—	—	33·5
112·5	—	—	2	—	2	8	3	4	4·5	4·5	5	1	—	—	—	—	—	—	—	—	—	—	34
114·5	—	3	2	8	8	10	16	12	8·5	11	7	3	—	—	2	2	—	—	—	—	—	—	92·5
116·5	—	—	5	6·5	3	16	20	9·5	11·5	9	13·5	3	2	1	3	1	—	1	—	—	—	—	105
118·5	1	—	3	4·5	4	12	9·5	9	19	27	17·5	14	10	6	1	3	2	1	—	—	—	—	143·5
120·5	1	2	3	3·5	4·5	8·5	11·5	19	32	41·5	20·5	23	11	14	2	7	3	—	2	—	—	—	209
122·5	—	—	—	3	4·5	11	9	27	41·5	31	37·5	23	21	11	7	2	3	—	1	2	1	—	235·5
124·5	—	1	—	1	5	7	13·5	17·5	20·5	37·5	35	29·5	22·5	13·5	8·5	5	5	4	1	—	—	—	227
126·5	—	—	1	1	1	3	3	14	23	23	29·5	28	21·5	12·5	14	9	2	4	2	—	—	—	191·5
128·5	—	1	—	—	—	—	2	10	11	21	22·5	21·5	38	19	11	7	3	—	—	1	—	—	168
130·5	—	—	1	—	—	—	1	6	14	11	13·5	12·5	19	12	11	11	3	1	2	1	1	—	120
132·5	—	—	—	—	—	2	3	1	2	7	8·5	14	11	11	10	5	2	1	4	1	—	1	83·5
134·5	—	—	—	—	—	2	1	3	7	2	5	9	7	11	5	12	3	3	3	1	—	—	74
136·5	—	—	—	—	—	—	—	2	3	3	5	2	3	3	2	3	6	—	—	1	1	—	34
138·5	—	—	—	—	—	—	1	1	—	—	4	4	—	1	1	3	—	2	3	1	—	—	21
140·5	—	—	—	—	—	—	—	—	2	1	1	2	—	2	4	3	—	3	—	2	2	—	22
142·5	—	—	—	—	—	—	—	—	—	2	—	—	1	1	1	1	1	1	2	—	1	—	11
144·5	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—	1	—	2	1	—	—	6
146·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Totals	2	8	24	33·5	34	92·5	105	143·5	209	235·5	227	191·5	168	120	83·5	74	34	21	22	11	6	1	1846

H (iii).

Head Height reduced to 12 years. Brother-Sister.

Brother.

Sister.	*106·5*	*108·5*	*110·5*	*112·5*	*114·5*	*116·5*	*118·5*	*120·5*	*122·5*	*124·5*	*126·5*	*128·5*	*130·5*	*132·5*	*134·5*	*136·5*	*138·5*	*140·5*	*142·5*	*144·5*	*146·5*	*148·5*	*150·5*	*152·5*	Totals.
106·5	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
108·5	1	—	1	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
110·5	—	1	2	—	1	2	1	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
112·5	—	—	—	1	3·5	·5	·5	4·5	2	2	—	1	—	—	—	—	—	—	—	—	—	—	—	—	15
114·5	1	—	—	—	4	3	1·5	5	6·75	2·25	3·5	·5	—	—	—	—	—	—	—	—	—	—	—	—	27·5
116·5	—	1	1	1	1	—	2	6	2·25	3·75	4·5	5	3	1	—	—	—	1	—	—	—	—	—	1	33·5
118·5	1	—	·5	1·5	—	4·5	4	5	6	5	3	6	4	5	1	—	2·5	1	—	—	—	—	—	—	50
120·5	—	—	·5	·5	2	3·5	3	9·5	8	11·5	5·5	8	11·5	2·5	1	1	·5	—	—	—	—	1	—	—	69·5
122·5	—	—	—	1	2·5	3	5·5	13·5	13·5	13	12	11	10·5	4	4	4	2	3	1	—	—	—	—	—	103·5
124·5	—	—	—	2	—	2	8	8	11·5	11	16	10	14	5	7·5	6	·5	2·5	1·5	·5	—	—	—	—	106
126·5	—	—	—	—	1	2	3·5	4·5	6·5	13·5	21	12	16	12	2	3	1	1	2	—	—	—	—	—	101
128·5	—	—	—	—	1	1	3	2	1	4·5	10·5	12	15·5	12·5	5	6	2	7	1	·5	·5	—	—	—	85
130·5	—	—	—	—	—	—	—	1	2	3	6	10	9	7·5	3	5·5	1	2·5	·5	1	—	—	—	—	52
132·5	—	—	—	—	—	1	—	1	1	3·5	3·5	4·5	6·5	7	5	3	1	—	2·5	2·5	—	—	—	—	42
134·5	—	—	—	—	—	—	—	—	—	4	3	6	5	6	2	—	4·5	1·5	2	—	—	—	—	—	34
136·5	—	—	—	—	—	—	—	—	—	1·5	2·5	1	1	1	—	1	1	—	1	—	—	—	—	—	10
138·5	—	—	—	—	—	—	—	1	—	1	—	1	1	1	1·5	·5	3	1	1	—	—	—	—	—	12
140·5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	2
142·5	—	—	—	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	2	—	—	—	—	—	4
144·5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	2
Totals	3	3	5	10	16	22·5	32	61	61·5	81·5	91	88	98	65·5	33	30	19	22·5	14·5	4·5	·5	1	0	1	764

ATHLETIC CAPACITY.

I (i).

Brother-Brother.

First Brother.

		Athletic.	Betwixt.	Non-athletic.	Totals.
Second Brother.	Athletic	906	20	140	1066
	Betwixt	20	76	9	105
	Non-athletic	140	9	370	519
	Totals	1066	105	519	1690

I (ii).

Sister-Sister.

First Sister.

		Athletic.	Betwixt.	Non-athletic.	Totals.
Second Sister.	Athletic	638	15	153	806
	Betwixt	15	16	11	42
	Non-athletic	153	11	452	616
	Totals	806	42	616	1464

I (iii).

Brother-Sister.

Brother.

		Athletic.	Betwixt.	Non-athletic.	Totals.
Sister.	Athletic	195	5	43	243
	Betwixt	5	2	2	9
	Non-athletic	91	5	86	182
	Totals	291	12	131	434

II. PSYCHICAL CHARACTERS. DETAILED TABLES.

VIVACITY.

J (i).

Brother-Brother.

First Brother.

		Quiet.	Noisy.	Totals.
Second Brother.	Quiet	917	292·5	1209·5
	Noisy	292·5	350	642·5
	Totals	1209·5	642·5	1852

J (ii).

Sister-Sister.

First Sister.

		Quiet.	Noisy.	Totals.
Second Sister.	Quiet	1013	349	1362
	Noisy	349	393	742
	Totals	1362	742	2104

J (iii).

Brother-Sister.

Brother.

		Quiet.	Noisy.	Totals.
Sister.	Quiet	360·25	164·25	524·5
	Noisy	79·25	148·25	227·5
	Totals	439·5	312·5	752

ASSERTIVENESS.

K (i).

Brother-Brother.

First Brother.

		Shy.	Self-assertive.	Totals.
Second Brother.	Shy	679	247	926
	Self-assertive	247	399	646
	Totals	926	646	1572

K (ii).

Sister-Sister.

First Sister.

		Shy.	Self-assertive.	Totals.
Second Sister.	Shy	672	296	968
	Self-assertive	296	436	732
	Totals	968	732	1700

K (iii).

Brother-Sister.

Brother.

		Shy.	Self-assertive.	Totals.
Sister.	Shy	241	114	355
	Self-assertive	70·5	147·5	218
	Totals	311·5	261·5	573

L (i). INTROSPECTION.

Brother-Brother.

First Brother.

		Self-conscious.	Unself-conscious.	Totals.
Second Brother.	Self-conscious	600	245	845
	Unself-conscious ...	245	550	795
	Totals	845	795	1640

L (ii). *Sister-Sister.*

First Sister.

		Self-conscious.	Unself-conscious.	Totals.
Second Sister.	Self-conscious	561	302·5	863·5
	Unself-conscious ...	302·5	588	890·5
	Totals	863·5	890·5	1754

L (iii). *Brother-Sister.*

Brother.

		Self-conscious.	Unself-conscious.	Totals.
Sister.	Self-conscious	126·25	210·25	336·5
	Unself-conscious ...	253·75	66·75	320·5
	Totals	380	277	657

POPULARITY.

M (i). *Brother-Brother.*

First Brother.

		Popular.	Unpopular.	Totals.
Second Brother.	Popular...	1107·5	185·5	1293
	Unpopular	185·5	147·5	333
	Totals	1293	333	1626

M (ii). *Sister-Sister.*

First Sister.

		Popular.	Unpopular.	Totals.
Second Sister.	Popular...	1133·5	182·5	1316
	Unpopular	182·5	175·5	358
	Totals	1316	358	1674

M (iii). *Brother-Sister.*

Brother.

		Popular.	Unpopular.	Totals.
Sister.	Popular...	432·75	54·25	487
	Unpopular	40·75	26·25	67
	Totals	473·5	80·5	554

CONSCIENTIOUSNESS.

N (i).

Brother-Brother.

First Brother.

		Keen.	Dull.	Totals.
Second Brother.	Keen … … …	970	216·5	1186·5
	Dull … … …	216·5	287	503·5
	Totals .. …	1186·5	503·5	1690

N (iii).

Sister-Sister.

First Sister.

		Keen.	Dull.	Totals.
Second Sister.	Keen … … …	1071·5	201	1272·5
	Dull … … …	201	278·5	479·5
	Totals … …	1272·5	479·5	1752

N (iii).

Brother-Sister.

Brother.

		Keen.	Dull.	Totals.
Sister.	Keen … … …	366·75	122·75	489·5
	Dull … … …	59·75	136·75	196·5
	Totals … …	426·5	259·5	686

TEMPER.

O (i). *Brother-Brother.*

First Brother.

		Quick.	Good-natured.	Sullen.	Totals.
Second Brother.	Quick	138·5	152·25	39·75	330·5
	Good-natured ...	152·25	1026·5	106·25	1285
	Sullen	39·75	106·25	84·5	230·5
	Totals	330·5	1285	230·5	1846

O (ii). *Sister-Sister.*

First Sister.

		Quick.	Good-natured.	Sullen.	Totals.
Second Sister.	Quick	198	177	77	452
	Good-natured ...	177	996	165	1338
	Sullen	77	165	120	362
	Totals	452	1338	362	2152

O (iii). *Brother-Sister.*

Brother.

		Quick.	Good-natured.	Sullen.	Totals.
Sister.	Quick	60	45·5	10	115·5
	Good-natured ...	68·75	388	43·75	500·5
	Sullen	13·25	56·5	18·25	88
	Totals	142	490	72	704

Ability.

P (i). *Brother-Brother.*

First Brother.

Second Brother.

	Quick-intelligent.	Intelligent.	Slow-intelligent.	Slow.	Slow-dull.	Very dull.	Totals.
Quick-intelligent	88	62·25	42·25	11	2	2	207·5
Intelligent ...	62·25	313·5	183·75	72·5	9·5	1	642·5
Slow-intelligent	42·25	183·75	255·5	73	22·5	8	585
Slow	11	72·5	73	97·5	39	4	297
Slow-dull....	2	9·5	22·5	39	28	7	108
Very dull.... ...	2	1	8	4	7	6	28
Totals	207·5	642·5	585	297	108	28	1868

P (ii). *Sister-Sister*

First Sister.

Second Sister.

	Quick-intelligent.	Intelligent.	Slow-intelligent.	Slow.	Slow-dull.	Very dull.	Totals.
Quick-intelligent	118	111	49·5	14	7	1	300·5
Intelligent	111	326	213	47	10	5	712
Slow-intelligent ...	49·5	213	204	99·5	30	9	605
Slow	14	47	99·5	64	29	7	260·5
Slow-dull.... ..	7	10	30	29	22	5	103
Very dull....	1	5	9	7	5	6	33
Totals....	300·5	712	605	260·5	103	33	2014

P (iii). *Brother-Sister.*

Brother.

Sister.

	Quick-intelligent.	Intelligent.	Slow-intelligent.	Slow.	Slow-dull.	Very dull.	Totals.
Quick-intelligent	53	39	23	8	5·25	·25	128·5
Intelligent	51	118·5	90	25	11·75	5·75	302
Slow-intelligent ..	17	77·5	119	39	15	5	272·5
Slow	7	28	38	29	7	1	110
Slow-dull	2	5	5	5	9	5	31
Very dull....	1	3	5	—	1	6	16
Totals....	131	271	280	106	49	23	860

HANDWRITING.

Q (i).

Brother-Brother.

First Brother.

		Very good.	Good.	Moderate.	Poor.	Bad.	Very bad.	Totals.
Second Brother.	Very good	52	51	27·5	3	1	—	134·5
	Good	51	335	224·5	32	4	1	647·5
	Moderate	27·5	224·5	406	101·5	15·5	2	777
	Poor	3	32	101·5	96	15	2	249 5
	Bad	1	4	15·5	15	7	1	43·5
	Very bad	—	1	2	2	1	4	10
	Totals	134·5	647·5	777	249·5	43·5	10	1862

Q (ii).

Sister-Sister.

First Sister.

		Very good.	Good.	Moderate.	Poor.	Bad.	Very bad.	Totals.
Second Sister.	Very good ...	50	29	23	5	—	—	107
	Good	29	334	170	36·5	6	—	575·5
	Moderate	23	170	300	90·5	17	5	605·5
	Poor	5	36·5	90·5	68	14	—	214
	Bad	—	6	17	14	10	4	51
	Very bad	—	—	5	—	4	4	13
	Totals	107	575·5	605·5	214	51	13	1566

Q (iii)

Brother and Sister.

Brother.

		Very good.	Good.	Moderate.	Poor.	Bad.	Very bad.	Totals.
Sister.	Very good	15	13	7	3	—	—	38
	Good	27	146·5	106·75	31·75	1	—	313
	Moderate	9	74	140·25	42·75	—	1	274
	Poor	—	13	40	31	4	2	90
	Bad	—	2	5	2	2	—	11
	Very bad	—	—	1	—	1	—	2
	Totals	51	248·5	300	110·5	15	3	728

NOTES ON THE ANCIENT POTTERY KILNS AT SAWANKALOK, SIAM.

By T. H. Lyle.

[With Plate XXIV.]

The results of a couple of days' investigation of the ancient kilns at Sawankalok may possibly be of interest, and will correct one or two erroneous statements made by me on a former occasion (*Man*, 1901, No. 41). So far as I can gather from traditions current in this neighbourhood, these kilns are assigned to the time of a powerful King of Sawankalok, or as the place was then called, "Sri Sachanalai." The name of this king was "Phra Roang." The fable concerning his birth and death bears a slight resemblance to the story of King Arthur in that he was the offspring of a being from the angel world, and an unaccountable disappearance whilst bathing forms the mystery of his return to his place of origin. No records exist as to the period of Phra Roang's reign; in fact, all Siamese history prior to 1350 A.D. is decidedly obscure, but, generally speaking, one might venture to attribute his reign to about the year 1000 of the Buddhist era (now 2443), say 1400 years ago, the fifth or sixth century A.D. Phra Roang is said to have travelled to China, and there to have married the daughter of the "King of China"; on returning to Siam with his wife, he was accompanied by "500" Chinese artificers, who evidently set up kilns in the neighbourhood of the capital, since "from that time the use of cups, bowls and dishes became customary in the country." The quotation is a translation of the only passage referring to these kilns contained in a manuscript history of this district, written during the last few months by an "oldest inhabitant" at the instance of the Siamese High Commissioner. The particulars of Phra Roang and the epoch of his reign are obtained from the same source.

Reference to the map will show Sawankalok to be situated on the Menam Yome, some two hundred miles due north of Bangkok. About twelve miles above modern Sawankalok (or as it is otherwise called, Wang Mai Khorn) the river makes a large bend north-east, then due west, and afterwards resumes a general northerly course. Within this bend, on the west bank of the river, are to be found some very fine ruins of Buddhist temples, and continuing to the west, one immediately comes upon the city walls of Sri Sachanalai. Within the boundaries of the old city are the remains of numerous temples and pagodas, hidden by large trees and completely overgrown with tropical vegetation and undergrowth. Many of these ruins have been examined, and, I believe, commented upon by Major Gerini of Bangkok, whose practical acquaintance with the antiquities of Siam and the ancient history of the Indo-Chinese races is perhaps unequalled.

So far as I could judge, there appear to be two distinct groups of kilns, both situated on the west bank of the river. The more northerly group or range of kilns commences some four miles above the old city. My former estimate of three or four hundred kilns, calculated upon statements made to me as to the extent of the range, is decidedly excessive. This portion of the river bank is covered with dense thickets of thorny bamboo, which render progress difficult and laborious, and speedily reduce one's garments to a very ragged condition. Vegetation, etc., limits one's view to a few yards only. My previous visit was made during the height of the dry season, when the undergrowth had been largely burnt off by jungle fires. A slightly more extended range of observation was possible under these circumstances, but owing to the extreme hardness of the ground, digging at that time was next to impossible. So far as I could observe, these kilns run parallel to the bank of the river in an extended line of more than a mile. The positions of some of the remaining kilns might point to the line having been a double one; in several instances, the action of the annual floods has eaten away the banks, and kilns have collapsed into the river. Indeed, the more perfect specimens of this ware have been picked up in the bed of the river after the water has sunk to summer level. The large specimen resembling a tea pot (Pl. XXIV, 2) and the large earthenware jar (Pl. XXIV, 1) were obtained in this manner. The number of kilns which have thus disappeared may not be inconsiderable, since it is possible to pick up chips and scraps of this ware on every sand bank and gravel bed in the river, even so far down as modern Sawankalok, a distance, allowing for the erratic course of the river, of at least twenty miles.

This northern range of kilns must have comprised not less than fifty of these structures. Of mounds and kilns, large and small, I counted thirty-two in various stages of ruin or of preservation, according as the ravages of time, vegetation and man had destroyed or spared them; whilst, in fourteen more instances, indications, consisting of broken brick, pipes and pottery, *débris* of the site of a kiln, were discernible. There were two or three types of kilns:—Single kilns, double kilns, in which the mouths or ovens point almost in the same direction, double kilns, with the ovens lying parallel but towards opposite points of the compass, and three kilns in close proximity, forming one mound.

It may be noted in passing that the very dilapidated remains or traces of three small Buddhist temples, placed at regular intervals along the line of kilns, show that the spiritual welfare of those residing in this neighbourhood was not neglected.

It struck me that the kilns are, on the whole, of a uniform shape, viz., a funnel to which is attached a "pear-shaped" oven resembling an oubliette lying on its side.

Seen from above, I can imagine the outline of a kiln to have been represented as in Fig. 1, *c.* In most instances, the funnel is entirely obliterated, and of the dome-shaped oven, the roof and walls, indicated by a curve, no longer remain. Of the part thus indicated, it would appear either that the roof had fallen in, half-burying, half-revealing the contents of the kiln, or that this portion had been broken into and the contents thrown out and scattered. The amount of broken ware, consisting for the most part of the bases of dishes, and of broken pipes or stands, surrounding and forming some of these mounds, is amazing. Of some of the most common patterns to be found on these remnants, I made rough copies and enclose them herewith. All these patterns were in very slight relief. Some dark colouring matter has also been used as a means of ornamentation. Judging from the nature of the *débris* to be found in the vicinity of each kiln, the northern half of this range had been devoted to the higher branches of manufacture—since the fragments consist entirely of celadon ware, and bear traces of artistic skill in their patterns, whilst in the southern kilns, the dimensions of which are apparently smaller than those in the northern half, earthenware has been the chief product.

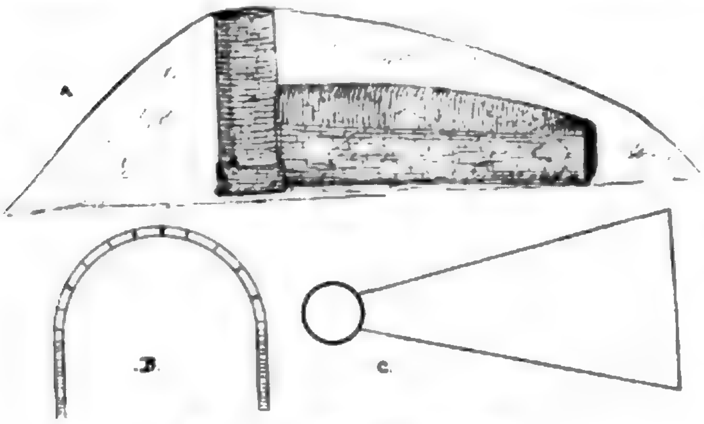

Fig. 1.—Diagram of Mound.
a. Elevation. *b.* Section through arch. *c.* Plan.

Mound No. 1[1] is one of the most compact, and perhaps the highest in this range. There is little or no pottery *débris* on and around this mound. In vertical height, it arises above the surrounding ground about 15 feet at its highest point. Traces of a funnel are not visible, though the outline of the walls of the oven, of a U shape, extend from the highest point in a sloping direction to the ground. This kiln lies, roughly speaking, north and south. Its banks are fairly steep on the north, west, and east sides, forming an angle of perhaps 120° with the ground. On these three sides, measurements from the base to the highest point give 26 feet, the slope in the southern direction, owing doubtless to the collapse of the oven roof, is longer, and more gradual, measuring 30 feet at 145° approximately. Considering the general compactness of this mound, and the absence of pottery ware amongst the *débris* of which it is composed, it is quite possible that this mound is practically untampered with, and that the fact of the walls of the oven being exposed is mainly due to the roof having fallen in of its own accord. White ants, decaying vegetation, and many centuries of changing seasons have perhaps combined to fill up any space or hollow caused by the collapse. My experience, however, in the case of an identical, and seemingly untouched, mound, was not encouraging, for on penetrating to a depth of about 6 feet, earth, broken pipes or stands, and brick rubble were the only products. Perseverance might possibly have been rewarded, but time did not admit of further investigation.

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[1] Mr. Lyle's plans of the mounds were not adapted for reproduction, and a diagrammatic view is given instead (Fig. 1).

Mound No. 2 is one in which the funnel and a portion of the roof and sides of the kiln are most distinct. These kilns have long since been robbed of their contents, and from the general appearance of the mound, one could imagine that the place had been a "dumping ground" for broken bricks and pottery. In the vicinity of the funnel, the mound rises to about 14 feet. Traces of a second oven exist, 40–50 feet distant in a southerly direction. Whether these two kilns have been distinct or not, it is difficult to say; at the present moment, they form practically one mound of *débris.* The visible portion of the funnel, measuring 6 feet 3 inches, inside diameter, is built a single brick in thickness, and the average measurement of these bricks, from outside to inside, is 3 inches. On the other hand, the bricks, of which the dome of this kiln is formed, measure 5 inches in depth, by, approximately, 2 inches by 7 inches.

The interior face of the bricks of the dome and sides is covered with a dark green and black slag, like glaze, apparently similar, but of inferior quality to that used on the porcelain ware itself. My ignorance on these subjects does not enable me to hazard any suggestion as to whether this interior glazing has been made purposely, or is merely the result of the action of heat upon the inside of the kiln.

It may be not unimportant to remark that, in the case of every dome I examined, the bricks did not appear to have been specially made for the purpose of building an arch or dome. They were symmetrical and rectangular. The places of "key stones" in the arch, were supplied by pieces of brick, chipped to the necessary wedge-shape, and inserted as required.

The mound No. 3 is curious, in that it exhibits three funnels—two of them identical in diameter (interior), 3 feet 8 inches, the third having an interior diameter of 2 feet 10 inches only. The fact that the distance, 37 feet, from the small funnel, No. 1, to its nearest neighbour, No. 2, is practically exactly double the distance, 19 feet, between funnels Nos. 2 and 3, may not be without its significance. The general height of this mound above present ground level is 3 to 4 feet only.

The kiln in mound No. 4 is by no means the least remarkable of these structures. In this instance, we have one compact mound containing two central funnels, 13 feet apart, and each situated 12 feet from the nearest edge of the mound respectively. The average diameter of the mound thus amounts to 37 feet. Moreover, the plane of the two kilns is parallel, but the oven portions have been built in diametrically opposite directions. The average height of this mound is 7 or 8 feet only; and the interior diameter of both the funnels is 3 feet 8 inches. In the roof of the southern dome, a hole about 6 feet in diameter has been broken, but although the kiln has no doubt contained earthenware, there is little or no *débris* in the vicinity to show that a search in this kiln has been productive. I entered the kiln by this hole, and found a cavity about 4 feet in height, with a sloping floor of earth and *débris.* The interior of the kiln is, of course, filled in with earth so far as one can see, in fact, the portion that one sees is, as it were, the top part of the "egg" only. It struck me that if one could succeed in unearthing the whole, one would find that the true floor of the kiln lies a foot or two below the present level of the ground outside. Considering the situation of these kilns on the banks of the river, and the fact that the Meyome is subject to extremely high rises during the tropical rainy season, it is very possible that centuries of floods may have resulted in raising the former level of the surrounding country by a foot or two of alluvial deposit. It was here that I was enabled to gain a clearer idea of the architectural construction of these kilns. It was noticeable that, for the first few feet, the walls of the oven were apparently perpendicular, but converged, and, at the same time, slanted upwards towards the funnel.

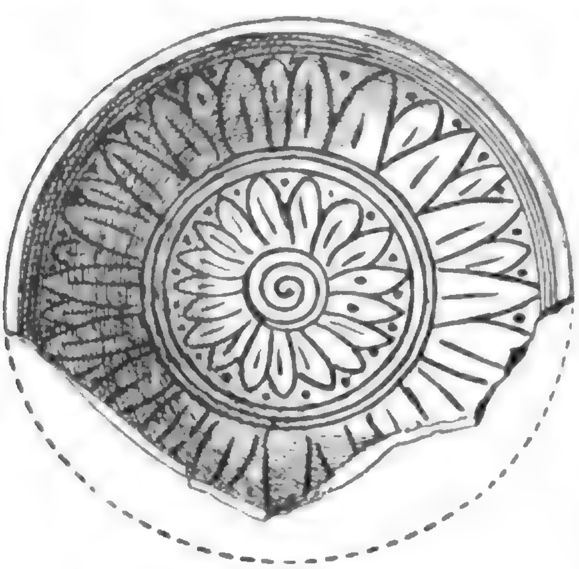


Fig. 2.—Plate from Sawankalok.

The accompanying diagram, Fig. 1, may render my meaning more intelligible. The size of the bricks of which this oven is composed is 6½ inches by 7½ inches by 2 inches. The walls having been raised perpendicularly to the desired height, by laying the bricks flat, 2 inches face inside, and width 6½ inches, the dome had been built by erecting the bricks at right angles (*sic*) to these layers, and the curve obtained by inserting, whenever necessary, a wedge of brick chipped to the required shape. A section of the walls and dome, showing the plan of the bricks would, therefore, offer an appearance of Fig. 1*b*.

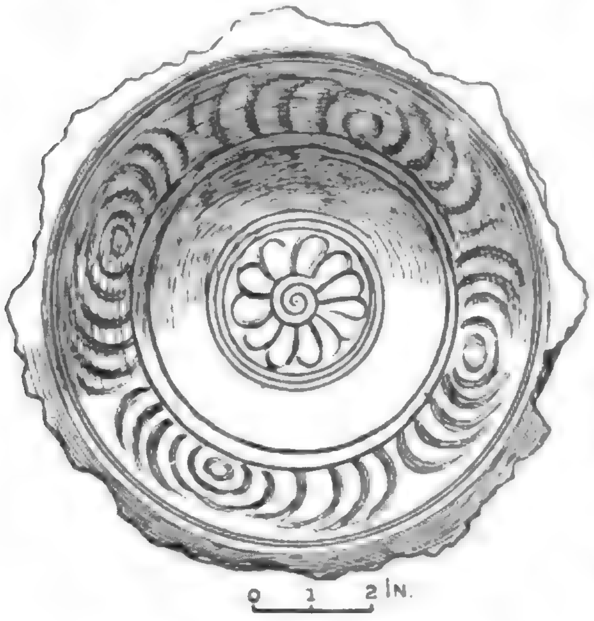


Fig. 3.—Plate from Sawankalok.

I have little doubt that all the specimens, both glazed and earthenware, forwarded by me to the British Museum, are the products of this northern range of kilns. Conspicuous amongst the *débris* are remains of the pipes or stands upon which the bowls, etc., have evidently been placed when in process of burning in the kilns (Plate XXIV, 3). These stands, it will be observed, vary in length from a couple of inches to two feet.

Concerning the southern kilns, about the group situated about one mile above the old city, I can offer but little information. They are even more hidden by vegetation, and enveloped in more obstinate thorny bamboo than those three miles above. I am under the impression that they are very little disturbed, and may not exceed twenty or thirty in number, but judging from the glimpse I managed to catch of one or two of the mounds, I am of opinion that they are in a less satisfactory state of preservation. It is quite possible also that ware of a slightly different quality was made here. A few chips of porcelain like that of the northern range are scattered about; but from one kiln there have been unearthed remnants of porcelain figures originally 3 or 4 feet high, representing those human beings of ferocious countenance, or "Giants" (Siamese "yak"), so much affected by the Chinese in the decoration and protection of their temples. Amongst the specimens will be seen the hand, which I picked up, of one of these creatures (Pl. XXIV, 1). This may be found useful for purposes of comparison. I noticed here also fragments of what appeared to be a heavy flooring tile, about 1 inch thick, of reddish earthenware, with a white glazed surface.

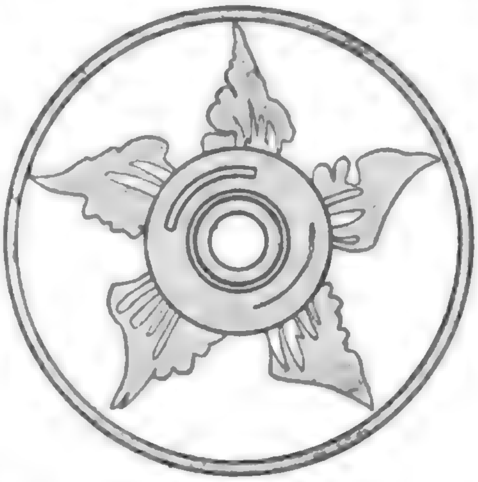


FIG. 4.—Pattern from Centre of Plate from Sawankalok.

In conclusion, I may remark that any investigations on scientific lines would have to be carried on under great disadvantages. There are the climatic obstacles of the hot and the wet season; in the former, the ground is baked so hard as to render digging most difficult, whilst the rapid growth of vegetation, no less than the certainty of constant fever, are to be seriously contemplated in the latter. The greatest crux would be, perhaps, the question of labour, both as to quantity and quality. The only digging tool of which the provincial Siamese has any conception is an iron "spade" or "mattock," barely differing in size and appearance from an ordinary table-spoon. European spades, pick-axes, and excavating tools would be as unsuitable to his strength as beyond his comprehension to manipulate. It would be well that a preliminary survey by one competent to judge of the resources and relative importance of these kilns should precede any suggestion of expenditure upon systematic excavation.

NOTE ON MR. LYLE'S PAPER BY C. H. READ, F.S.A.

THE discoveries made by Mr. Lyle, and described in the foregoing paper, are of very great interest in the history of Oriental ceramics. The presence of vessels, or fragments, of celadon ware in widely separated parts of the East, extending even to the interior of Borneo, has long been a puzzle to students of the subject. The existence of ancient specimens of Chinese celadon, and the Chinese traditions as to its antiquity, have led to the assumption that the whole of the production of ancient times was to be attributed to China. This very natural error we are now able to correct, and the extensive series of specimens, chiefly "wasters," which Mr. Lyle has been good enough to send to the British Museum, will serve as ample proof that in Siam, at least, there was in ancient times a very considerable manufacture of celadon ware, which it is, in many cases, hard to distinguish from that made in China. The evidence is of the most complete character. Not only are vast quantities of refuse from the potteries scattered over the country, but the actual furnaces and the tubes, used to support the vases in the kilns, have all been found, and great credit is due to Mr. Lyle for the thorough and convincing character of his investigations. It is not easy, or even possible, in figuring specimens of porcelain, to show the characters with sufficient clearness, and recourse must be had to description. The classes of ware that seem to have been produced at this ancient Siamese pottery, embrace a considereble range. Among the fragments have been found small vases and bottles of a fine pottery covered with mottled glaze, the shapes often elegant, and sometimes highly finished, recalling the fine tea-jars made at Takatori in the province of Chikuzen in Japan. There are even coarser unglazed wares, which again resemble some of the dolmen pottery in the British Museum, discovered in Japan by Mr. W. Gowland. These were made in the southern group of kilns. Then amongst the celadon itself, the quality varies from a coarse stoneware to a fine white porcelain, which would be translucent had it been thinner, and the quality of the glaze, and the success with which it has been applied, equally varies to as great a degree, but reaching, in the finest pieces, a high standard of excellence. It is thus certain that the Siamese potters were able to make as fine a ware, and as highly finished, as their Chinese neighbours.

There is unfortunately no means of fixing a precise date at which this pottery flourished, but, for what it may be worth, it may be well to note that the incised decoration of the Siamese pieces more nearly resembles that of the Chinese of the thirteenth or fourteenth centuries than any later examples. The enduring character of this remarkable ware, whether made in China or elsewhere, has led, on this ground alone, to its being imported and valued in almost every part of the Eastern Hemisphere. In England, one of the most remarkable pieces is a bowl given by Archbishop Warham to New College, Oxford. The Archbishop died in 1532. This piece has the incised decoration under the glaze, which is commonly found in examples of about this period. Celadon ware was extensively used in India, and

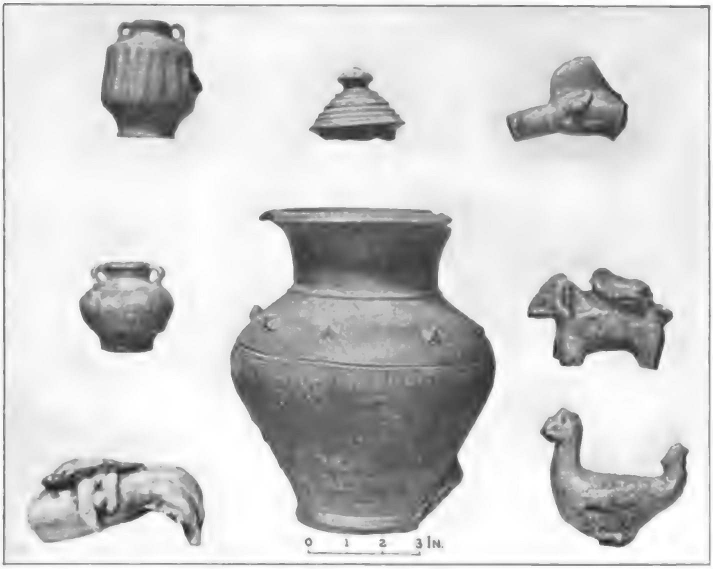
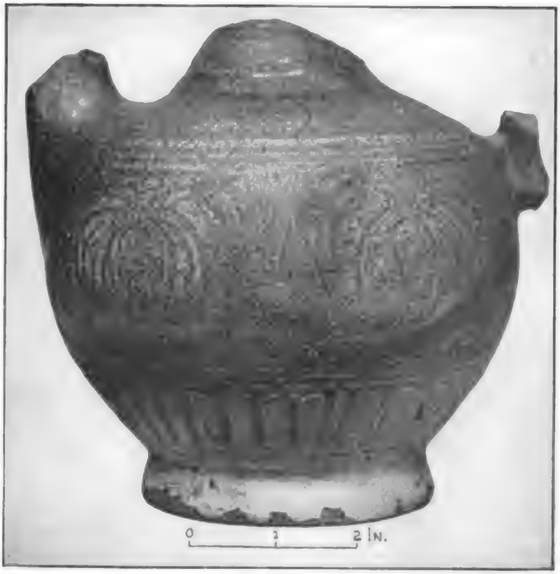


FIG. 1.



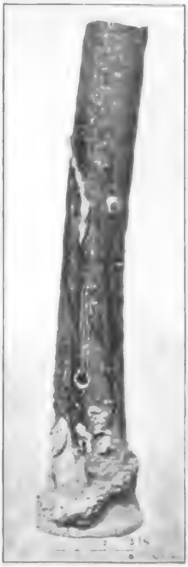


FIG. 2.

FIG. 3.

THE ANCIENT POTTERY KILNS AT SAWANKALOK, SIAM.

great quantities of fragments are found on ruined sites on that part of the continent. In the Persian Gulf, throughout the whole of the Malay Peninsula, and over the whole of the East, there seems to be a superstitious value attached to it, owing no doubt to the mediæval superstition that the ware had the power of detecting poison when put into it. There can be no doubt, I think, that the origin of the colour was a desire to make imitations of jade vessels in this material, a greenish gray being the colour most commonly found in Chinese jade.

An exhaustive account of the occurrence of these wares in Malaysia has been published by Dr. A. B. Meyer (*Alterthümer aus dem Ostindischen Archipel*, etc., Leipzig, 1884), and a very learned and useful article by Professor Karabacek appears in the *Osterreichische Monatsschrift für den Orient*, December, 1884, where Dr. Meyer's work is reviewed, and the general question of Muslim ceramics is discussed. He quotes an Arab writer of the seventeenth century as stating that "in his time costly and beautiful celadon bowls and vases were made at Martaban, and exported to all parts. These pieces are not so neatly made, and not ornamented in the same way as the Chinese." This remarkable statement confirms the common Oriental name for this ware of "Martabani," which, like the terms Gombroom ware and Nankin china, would now seem to indicate only the port from which the goods were sent. There can be no doubt that a large proportion, at any rate, of the celadon which was exported from Martaban must have been made at the Siamese kilns now in question. In addition to this evidence, the forms of the pieces found by Mr. Lyle are those which are commonly seen in the Malay Archipelago, such as the small spherical vase with two small looped handles, apparently a characteristic form, and another representing the cover of a cremation urn such as is used in Siam at this day, the form being a depressed copy of the series of discs used to ornament the summit of the Siamese dagoba.

THE SURVIVAL OF PRIMITIVE IMPLEMENTS, MATERIALS AND METHODS IN THE FAROES AND SOUTH ICELAND.

By Nelson Annandale, B.A.

[With Plate XXV.]

The Faroes and Iceland are so rapidly losing all that is primitive in their culture, that I have thought it well to put on record such information regarding the survival of primitive implements, and the like, as I have been able to obtain during six visits to the islands of Stromoe, Naalsoe, and Myggenaes, the Westmann Isles (Vestmannaeyjar), and South Iceland between the years 1895 and 1903. In Landt's *Description of the Feroe Islands* (London, 1810), a book first published in Danish a century ago, but still by far the best account of the Faroes to which I have been able to gain access, we have a mine of information about the life led by the islanders in his generation, enabling us in some cases to trace the retrograde evolution and final disappearance of the relics of primitive culture, and I shall have to refer frequently to this valuable work. My descriptions of implements are chiefly based on my own collection, the bulk of which is now in the Pitt-Rivers Museum at Oxford.

I must express my thanks to the curators and other officials of the Museum of Science and Art in Edinburgh and the National Museum of Antiquities in the same city for the aid they have given me in obtaining photographs of specimens in their charge, and also to Mr. Henry Balfour, whose advice has been of the greatest assistance, both in preparing this paper and in making the collection.

Though I do not propose to draw ethnological conclusions from the specimens and methods described, it can do no harm to call attention to the differences between those from the Faroes and those from Iceland, for no anthropologist could see a group of typical Icelanders and one of typical Faroemen without recognizing that there is now a very marked racial difference between the two peoples, whatever its cause may be. Doubtless, differences of environment have caused some things to survive in the Faroes which have disappeared in Iceland, and *vice versâ*; but I am not at all sure that this is the only factor that has produced the differences of physical type and of characteristic implements to which I allude. An interesting inquiry, moreover, for which I have not the materials myself, would be a comparative study of the ethnography of the different islands of the Faroe group, for, even at the present day, there is not much communication between the more remote villages, while Dr. F. Jörgensen's elaborate monograph,[1] in which anthropometrical details regarding 2,000[2] persons are given, and which is corroborated, as far as the present point is concerned, by a small series of measurements recently taken in Thorshavn by myself, would seem to indicate that a marked difference exists between the physical anthropology of Suderoe (South Isle)[3] and that of the more northerly islands. In the case of the Westmann Isles we know that the inhabitants are not descended from those of Rangarval, the district opposite on the mainland of Iceland, but from settlers[4] who came from the north of the larger island in recent times, and here, too, a similar difference in the primitive implements, if not in the physical type, is found.

OBJECTS OF STONE, BONE AND SKIN.

The provenance of stone implements of different types and uses was once extensive in Iceland, judging from specimens in the Reykjavik Museum, though the Norsemen, who were the first permanent colonists of the island, had reached a comparatively high level of civilization before its discovery; but I am not aware that the Reykjavik collection has ever been properly investigated, and have had no opportunity of examining it minutely myself. At the present day two very distinct types of stone hammer or pounder exist in use in the district under consideration, one, which shows sign of obsolescence, in Iceland, and one, which is rapidly becoming obsolete, in the Faroes. The Icelandic type (Pl. XXV, 1), which does not occur now, so far as I have been able to discover, in the Westmann Isles, though it is widely spread on the mainland, bears something of a resemblance to certain stone clubs from New Guinea, though generally of ruder make, consisting of a heavy disc of stone, rough-hewn and perforated for the reception of a wooden shaft, which passes right through it, but does not project to any great extent above; it is used in pounding dried fish, which is eaten raw after being reduced by it to a mass of fibres. In a specimen in the Pitt-Rivers Museum the head is made of lava very imperfectly smoothed, and measures 6¾ inches in diameter and 3¼ inches in depth; another is considerably broader and not so rough. The shaft, which is neatly smoothed and polished, is 1 foot 8 inches long, and about 2 inches thick; it is kept in position by means of little wedges of wood hammered in between it and the head. Many specimens that I have seen in use, however, have been fitted with a longer and rougher shaft, which, in a few instances, has had a distinct bend or elbow some distance below the head, rendering it easy for a person to pound fish standing. The implement is used by women.

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[1] *Anthropologiske Undersøgelser fra Færoerne: Afhandling for Doctorgraden i Medecin ved Kiöbenhavns Universitet*, Copenhagen, 1902. Annandale, *Proc. Roy. Soc. Edinburgh*, vol. xxv, pp. 1–24, 1903

[2] The population in 1901 was about 15,000 (Ostendeld, *Botany of the Færoes*, Part I, p. 7, London and Copenhagen, 1901).

[3] Cf. Landt, *l.c.*, pp. 386, 387.

[4] Mackenzie, *Travels in the Island of Iceland during the Summer of the Year* MDCCCX, pp. 412–415. Annandale, *Man*, 1903, p. 79.

The Farish stone pounder (Pl. XXV, 10) is employed in the preparation of tormentil (*potentilla erecta*) and other roots[1] used in tanning sheepskins, and possibly was also used in the preparation of lichen dyes, though these are practically obsolete. It will be unnecessary to give a detailed description of the implement, as this has already been done elsewhere.[2] At the present day it consists of an unworked water-worn stone of an oval shape, generally between 6 and 7 inches long, and between 3 and 4 inches in diameter. It is grasped in the right hand and brought down with a rotatory motion on a mass of the roots, which are collected in a small egg-cup-shaped hollow, apparently produced by usage, in a rock either on the sea-shore or above the cliffs which skirt a good part of the coast. I have once seen these depressions in an isolated boulder, but they generally occur in flat masses of rock. Formerly, I am told, the pounder was often provided with a vertical wooden handle, which was either thinned down at one end and jammed into a hole drilled to the depth of about an inch in one end of the stone, or else was lashed to it by cords or leather thongs passing along grooves cut on its surface. I have not seen either of these types, and my information regarding them is derived from old men in different islands, one of whom made me the model figured. Landt only mentions the simple unworked stone. The operation of pounding tormentil roots, as in Landt's day, is always performed by women, who also used the pounders, incidentally, for a variety of other purposes, such as breaking up peat, smoothing leather, and, occasionally, for pounding fish, the Icelandic implement for this purpose being apparently unknown in the Faroes, just as the Farish tormentil pounder is unknown in Iceland, where I do not think that tormentil is used in tanning.

The survival of such primitive implements as these among a civilized people and in modern times is interesting in itself, but the use of mortars of the kind described is especially interesting to Scottish antiquaries, as depressions,[3] which I have been unable to distinguish from them, occur not uncommonly in rocks in the Western Highlands and Islands, where we know that tormentil roots were formerly employed as a tanning material.[4] Stones, too, closely resembling the Farish pounders are still, or were until recently, used in the north of Scotland[5] for miscellaneous purposes and have been recovered in very large numbers from the brochs.[6]

The use of stone sinkers for fishing-lines (Pl. XXV, 13) still persists both in the Faroes and on the Icelandic coast, as it does in parts of Scotland. The specimens from the Faroes, however, are often fastened to the lines in an ingenious manner that

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[1] Grossman, *Geograph. Journ.*, vol. vii, 1896, p. 10.

[2] *Proc. Soc. Antiq. Scot.*, vol. xxxii, 1897–1898, pp. 52–54.

[3] See W. Jolly, *Proc. Soc. Antiq. Scot.*, vol. xvi, 1881–1882, pp. 393–401.

[4] Dr. Johnson's *Journey to the Western Islands of Scotland*, p. 110, London, 1791.

[5] Mitchell, *The Past in the Present*, p. 129, Edinburgh, 1880.

[6] *Ibid.*; and *Cat. Nat. Mus. Antiq. Scot.*, p. 231, GB 3–6.

I have not seen employed elsewhere. Those on hand lines are usually of the same general form and size as the tormentil-pounders, but they have a hole drilled in one end, and into this a small peg of wood wrapped in hide is tightly hammered. The sinker is then soaked in water, which causes the wood and hide to swell to such an extent that a line attached to either of them is quite secure, although a specimen weighs as much as 3½ pounds. For long lines with many hooks, which are, however, a recent innovation—they have only been introduced into the Westmann Isles by an English fisherman within the last ten years—the Faroemen use large flat stones of many pounds' weight as sinkers, attaching them either in the way just described, or by means of a string passed through a hole bored right through their substance at one side. The Icelandic stone sinkers that I have seen are fastened, on the other hand, like the Scotch ones,[1] by means of cords or thongs, which may or may not have grooves cut for their reception on the surface.

Hand-querns are employed for grinding corn both in Iceland and in the Faroes; though as long ago as the beginning of the nineteenth[2] century, water-mills of the "Norse"[3] type were beginning to take their place in the Faroes, wherever there were water-courses convenient. In these islands the quern-stones were chiefly made in Naalsoe, where suitable stone was found, and in this locality a considerable number of hand-querns are still in daily use, as there are no streams, though many more of the stones may be seen, cast-out and idle, lying about the village. In Iceland, though all grain used in those parts of the island I have visited is imported, the employment of this primitive method of grinding corn appeared to be fairly persistent as late as 1898, the longer distances over which imported goods have to be carried on horseback rendering the older methods slower of disappearance, in spite of the fact that corn itself is an imported article. The abolition of the crown trading monopoly in Iceland and the Faroes, which occurred in 1856 and 1874, is gradually bringing about an ever-increasing import of foreign flour and other ready-made materials. The Farish quern stones (Pl. XXV, 2) are flat discs about 2 feet in diameter and 4 inches deep, the lower of the two being fixed, by means of wooden pegs placed at intervals round it, to a wooden tray with three raised sides. The handle is of wood, and pieces of leather of different thickness are placed between the two stones to regulate the fineness of the meal. In Iceland the type is similar, but the stones are sometimes deeper in comparison with their diameter, and the shank-bone of a cow or pony is often used as a handle, wood being more expensive, because of the greater distance from which it must be brought.

In the Faroes another type of quern was used until recently for grinding mustard, a condiment of which the islanders are fond; it was smaller than the corn quern and the upper stone fitted into a cavity cut out in the nether, which had an uncovered spout, carved in the same piece, for the delivery of the ground material. A specimen from Thorshavn measures 11½ inches in diameter, and the spout, which is sculptured with three ornamental steps above, projects about 3 inches.

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[1] *Cat. Nat. Mus. Antiq. Scot.*, p. 71, AX 23, 24, 25.

[2] Landt, *l.c.*, p. 293.

[3] Mitchell, *l.c.*, pp. 39–41.

Such, so far as I know it, is the provenance of modern stone implements in the Faroes and Iceland, but it is probable that many others have recently disappeared. A few I may mention briefly:—for instance, the stone whorl formerly used as a weight on the pump-drill in the Faroes, where its place is now taken by a disc either of lead or of whale's bone coated with lead above and below. Specimens of this stone weight are commonly found near the village of Solitude, on the west coast of the island of Stromoe, where they are believed by the people to be the weapons of two armies who are said to have fought a battle there. A specimen from this locality measures 2¾ inches in diameter, being accurately circular, though somewhat rough, and 1½ inches in thickness; the upper and lower surfaces are flattened, the sides rounded, though it is evident that they have first been made three-sided and have then had the angles smoothed away; the perforation for the shaft of the drill is large and smooth, except at its ends, where it is rather irregular. In Iceland stones of much the same appearance as the Farish hand-line sinkers, but perforated near one end, were, and possibly still are, used as weights on steel-yards of the type with movable weights, while both in the Faroes and Iceland, perforated stones of irregular outline were suspended from the warp in the primitive upright loom, which, though it is now quite obsolete, was the only kind known in the Faroes at the beginning of the nineteenth century.[1] Both in the Faroes and in Iceland, stone lamps were used comparatively recently, specimens being occasionally found in digging on the sites of former houses; one thus brought to light in the Westmann Isles is now in the possession of Mr. Henry Balfour, who has kindly permitted me to examine it. It consists of a flat volcanic stone, slightly water-worn, in the upper surface of which a shallow depression, roughly wedge-shaped in outline, has been scooped out, measuring 4¼ inches in length, and 2¼ inches in breadth at the base, which is rounded; the apical part of the wedge, which is slightly constricted from the rest at a point 1½ inches from the apex, served, without reaching the edge of the stone, as a channel to hold the wick, which was probably of wool; the stone itself is oval, 5½ inches long, 5 inches in maximum transverse diameter, and 1½ to 1¾ inches in thickness. Judging from a date carved on a horn spoon found with it, this lamp is about 270 years old; its workmanship is superior to that of some more recent Scotch and Orcadian specimens, and also of one I have seen that had been dug up in the Faroes. At first I was inclined to regard the Westmann specimen rather as a mould in which metal lamps were beaten out, but the great depth of Icelandic brass and iron lamps of the "crusie" type precludes this idea.

In the Faroes the bones of the Pilot Whale (*Globicephalus melas*) are those chiefly employed in the manufacture of objects of daily use, serving also unworked for a variety of purposes. When fresh they are in use as fuel for the fires over which fish-oil is boiled, and the dried ribs act as rollers over which boats are pulled up the shore; where the landing-place is steep, as on the little island of Myggenaes, they are permanently kept in position for this purpose, forming a kind of boat ladder. Boats in the making or being painted are often propped up with the skulls, and the boat-builder sits on one of the larger vertebræ. The smaller ones are dragged about as "toy carts" by the children, who have never seen real carts, and who make another toy by threading one of the smallest vertebral epiphyses—thin discs of bone that lie between the bodies of the vertebræ in the region of the tail—upon a loop of wool or string. The ends of the loop are held, as wide apart as possible, in the two hands, and it is caused to rotate in such a way that it becomes completely twisted, the discs then revolve rapidly, producing a humming sound, if the hands be alternately approached to and drawn apart from one another. This "hummer" is exactly parallel to one made by English schoolboys, who use, however, discs of cardboard or metal, the latter often notched along the edges, instead of the epiphyses of a whale, while Malay boys in Kelantan employ large circular seeds for the same purpose, placing an open cocoanut shell beneath to increase the sound, so that the toy is one of wide distribution, and in all probability of independent evolution in different countries and climes. To return to the bones of *Globicephalus melas*:—the jaws of young individuals of this whale, which is really a large dolphin, are pulled asunder in front and the peg-like teeth are extracted, the bone is hacked away to a slight extent on the inner surface near the condylar end of the jaw, and a fairly efficient shovel for putting peat on the fire is thus produced (Pl. XXV, 9), though it would be more efficient if the condyle was cut away from the outer surface, which is left absolutely intact. It is, of course, the broad, laterally expanded part of the bone near the condyle which acts as shovel, that part which bears the teeth forming the handle.

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[1] Landt, *t.c.*, pp. 368, 369.

In the Westmann Isles and on the mainland of Iceland bones, both of whales and of terrestrial mammals, are employed in making a variety of implements and appliances, some of which are of so primitive a character that it is hard to realize that they are made and used by the race which probably is the most highly educated, as a people, in Europe. On Heimey, the only inhabited island of the Westmann group, the most notable use of bones at the present day is their employment as skates, or rather sliders, two types of which are still made by children as playthings, though they have died out of use among adults. The simplest of these two types is similar to one[1] formerly used in Great Britain and throughout North-western Europe, consisting, essentially, of the shank-bone of a small cow or pony. All the specimens which I have seen in the Westmann Isles have been perforated transversely at a little distance from each extremity, a loop of cord has been passed through the posterior perforation, and a string with loose ends through the anterior one. In use, the loop was passed over the front of the foot, while the loose ends of the string were passed between it and the leg after being crossed over the instep, were drawn tight, crossed again, wound round the ankle and finally tied, either behind or in front.[1] Old men, however, have told me that in their boyhood it was not customary to use strings for the *leggir*,[2] as the bone skates are called, but that they were kept in position beneath the soles of the feet merely by the weight of the person using them and by friction. With the bones tied to his feet a boy is bound to fall should his course be suddenly interrupted, but without fastenings the skates slipped from under his soles, leaving him standing upright. Doubtless, however, more skill was needed in sliding in the old fashion.

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[1] Balfour, *Reliquary and Illustrated Archæologist*, 1898, pp. 1–9.

The second type of bone skates (Pl. XXV, 4) appears to be, as far as is known, peculiar to Heimey. It consists of a shuttle-shaped piece of more or less flat bone, about 8 inches long, cut from the rib of a whale and straightened, if necessary, by pressure. A wedge, generally about 2½ inches broad at its base, that is to say, at the edge of the bone, is cut out from each side near the posterior end, and a perforation made transversely between the two notches thus formed, a similar perforation being made through the bone about 1½ inches from the other extremity. The bone is cut off square before and behind, but narrows considerably at either end, especially towards that which becomes the front of the skate. A loop and a string with free ends are passed through the two perforations, as in the simpler type, and serve the same purpose. I have heard on Heimey that skates like the one just described are sometimes made of wood, but have not been able to see a specimen.

With both types of bone skate a spiked staff is used, the hands of the slider being rested on its head, while he pulls himself along by driving the spike into the ice, releasing it and driving it in again in front of its former position. A specimen of this staff, which must have been used by a small child, measures 2 feet 9 inches in length, the upper two-thirds being rounded and the lower third polygonal in cross-section; the iron spike with which it is shod is 2¾ inches long, and is decorated above with four loops; the wood is painted red and ornamented with an incised brass band 6 inches below the head, which is rounded on the sides and flat above.

Heimey is very probably the only part of Iceland where bone skates survive in use even as children's toys, though they were employed on the mainland until quite recent days.[3] I have not been able to hear of their existence in the Faroes, where several of the larger lakes are said never to freeze; but it is very improbable that they were not once in use here also.

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[1] Balfour, *loc. cit.*

[2] The plural of *leggr*, a leg or hollow-bone. (Cleasby, *Icelandic-English Dictionary*, Oxford, 1874.) This authority does not give "bone skate" as a possible translation of the word, so that its usage in this sense is probably local. The name is applied in the Westmann Isles to both types of bone skate.

[3] Romilly Allen, *Reliquary and Illustrated Archæologist*, 1896, pp. 33-36. Mr. Cock's specimen described in this paper, and obtained on the mainland of Iceland in 1878, is practically identical with my own.

In the store-houses and lumber-rooms of farms in Rangarval, the district immediately opposite the Westmann Isles, though I saw no bone skates, I found some extremely primitive bone implements. Among the most interesting were strings of bone pins used in drying skins (Pl. XXV, 5). They were flat splinters, probably from the limb bones of sheep, having a perforated head through which they could be strung together on a cord. The longest was rather over 3 inches in length; the head, which projected slightly towards one side, merged gradually into the shaft, which was sharply pointed at the other extremity, and the perforation was large in comparison with the diameter of the splinter and regularly circular, probably having been made with a pump-drill. These bone pins were used in 1898 in fastening out drying skins on the turf-covered walls of the houses, but in many farms wooden pegs, neatly turned and almost certainly of foreign manufacture, served the same end, though, not being perforated and not being flat, they could not be strung together, and so occupied far more space when not in use. Similar splinters of bone, sometimes perforated at the broader extremity and sometimes not, occur in many prehistoric deposits in Great Britain and France, and may very well have been used for the same purpose.

In the same farms on the south coast of Iceland I obtained specimens of bone-pliers (Pl. XXV, 6) used for seizing the needle employed in sewing fishermen's oilskins[1] when it had penetrated the leather, the contrivance, clumsy as it seems, being found to save the fingers in pulling the point through so unyielding a substance. These pliers were made out of the long bones of seals, the same bone not always being used, and the only requisites for the ones chosen being that they should be of convenient length, straight on the whole but with a slight upward curve in their main axis, and should have natural projections in the same plane as that of their main axis at one extremity. The two bones had been ground smooth along their inner surfaces, so that they could be closely applied to one another along the greater part of their length by these surfaces, and the natural projections at what became the upper end had been perforated and lashed together with leather thongs. It is evident from the high polish that one of the specimens has assumed, and from the way in which another,[2] which has been broken, is rendered secure by additional thongs, that the pliers were in constant use and were regarded as having some value.

Although the needles used with these pliers were made from pieces of iron wire, bone needles of another kind, and for another purpose, were, and probably still are, in daily use in Rangarval. They are flat, shuttle-shaped pieces of whale's rib, very much narrower than the bone skates, provided with a large "eye" at one end and sharply pointed at the other (Pl. XXV, 7); they were used in stringing together cod and other fish through the heads, in order to facilitate transport between the sea and the farm. A specimen measures 8½ inches in length and rather over an inch in breadth where it is broadest, not very far from the point; towards the "eye," which is oval in shape and about 1½ inches long, it narrows slightly, thus rendering it more difficult for the fish to slip off the string, which passes through the "eye" and is held in position by being looped back and tightly bound to itself with fine twine. The string has worn a groove in the posterior wall of the "eye," which it would finally, in all probability, have broken right through. Some specimens of the needle that I saw were very finely polished and had their owner's initials neatly carved upon them. The string is never detached from the needle, but after the fish are on the former a knot is tied, and the whole is carried either on a man's, or on a pony's back.

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[1] They are made of skins soaked in linseed oil, or, if this cannot be procured, in that made from the livers of the Saithe (*Gadus virens*).

[2] *Proc. Soc. Antiq. Scot.*, vol. xxxiii, 1898–99, p. 72, fig. 2.

Curiously enough, Mr. Henry Balfour tells me that the only parallel for this type of fish-carrier that he knows is one used by the natives[1] of the Gran Chaco in Paraguay; it has a wooden needle which is narrow and spike-shaped, but, in principle, exactly agrees with the Icelandic specimen, thus affording an interesting example of parallel development, or, as it would be called in zoological parlance, adaptive resemblance or convergence. From another point of view it is worthy of note that not one of these bone implements from the coast of Iceland appears to be in use among the inhabitants of the Westmann Isles, which are not more than 20 miles distant as the crow flies from any of the farms in which the specimens described were obtained, but are separated from the coast immediately opposite them by a strait full of dangerous currents and a shore beset with shifting volcanic sands, on which a tremendous surf perpetually breaks, rendering it safer for the islanders to visit some other part of the mainland than that nearest their own home.

Another use to which bones are put, probably in Iceland as well as in the Faroes, from which I have seen specimens, is the manufacture of spindle whorls (Pl. XXV, 3), which are made from the upper part of the head of the femur of a cow or pony, this piece of bone being naturally smooth and rounded.

In the rivers of Iceland the nets used for catching salmon and trout are frequently weighted by having a line of bone sinkers (Pl. XXV, 8) attached to their lower extremity. These sinkers are made of various parts of the skeletons of sheep, cows, and ponies, but one of the commonest types consists of a length of about 2½ inches severed from the inferior end of the shin bone of a cow and pierced through its main axis on one side. The string which fastens it to the net passes through this perforation, and sometimes through another made through the bone from back to front, as well as being tied round the natural groove at its extremity. Similar objects,[2] but not pierced longitudinally, have been been found in brochs in Orkney, where they probably had the same use.

The last Icelandic bone implement that I shall mention is one of which I never happened to obtain a specimen, so that I can only describe it from memory, aided by a very brief note. It is the bone used in hobbling ponies all over Iceland, and consists of one of the long bones of a sheep or small cow, with a woollen rope tied round a groove near one end. The bone is placed in front of the pony's fore-legs, rather low down, and the rope is twisted round them and tied again to the other end, thus hobbling the pony and preventing it from wandering far in search of pasture.

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[1] Graham Kerr, *Phil. Trans. Roy. Soc.*, B, vol. 192, 1900, p. 305.

[2] *Cat. Nat. Mus. Antiq. Scot.*, p. 244, HA 36.

A bone implement which has become obsolete in the Faroes with the upright loom is the bone weaver's sword,[1] which was carved out of a Pilot Whale's jaw or rib, and specimens of which are still occasionally to be found, their surface being a convenient one on which to cut tobacco.

As has been already noted, the Faroe people commonly cure their sheep skins with the aid of tormentil roots, thus producing a very fine leather of a yellowish colour. The best quality was formerly suspended in the smoke of the kitchen fire, which only escaped through a small hole in the roof, before it was used, but space forbids me to enter upon the question of how the leather is manufactured; an account of the process will be found in Landt's *Description* (p. 370.) Most of it is made into fishermen's overalls or into thin shoes, which are worn about the house and in the villages by both sexes, stout wooden clogs with dressed leather toe-caps being worn over them outside and left at the door of the house. In making these shoes, a strip, oblong in shape, and of a size conformable to the foot for which it is to be adapted, is cut from a skin, the person who is to wear the shoe puts his foot upon it and it is folded up over the toes in front, and round the back of the heel behind, in order to get the exact size; any superfluous material is snipped away and the shoe is sewn up at either end, leaving a V-shaped opening over the instep. A couple of holes are made in the leather on each side of this opening, and knitted woollen strings are fastened through them, crossed over the instep, twisted several times round the ankle, and secured behind by having the loose ends tucked in. The people are very particular not to fasten the strings too high on the ankle, and men always wear them white, while those used by women and children may be red or blue. Similar shoes made of raw hide, often with the hair left on outside, are used on the hills and in the fishing-boats. In Iceland the native shoes are of a similar type but of neater make, having knitted woollen soles placed inside and being bound along the edge of the opening above with a narrow band of skin; they are made sufficiently tight to the foot to need no string, but being of skin, often that of seals, not cured so as to be flexible, they can only be worn when soaking wet. A passage occurs in one of the sagas in which it is described how two men, who had taken off their shoes while hay-making, were surprised by their enemies and slain, because their shoes had dried in the sun and they could not get them on again. Both the Farish and the Icelandic shoes are merely forms of the type known as "rivelins" in Shetland, and also used in some of the more remote parts of the West

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[1] Mitchell, *Proc. Soc. Antiq. Scot.*, vol. xxxii, 1897–98, p. 185, fig. 6.

Coast of Ireland, and it is noteworthy that this type appears to approach nearer to the American mocassin the further north it is found, though no genetic connection probably exists.

In the Faroes sheepskin is not only used for making shoes, but it is also employed for a variety of purposes—for wrapping up perishable goods, for covering the little wooden milk-pails carried out every evening to the hills and for making sieves for sifting flour. These are formed by stretching the leather across an oblong wooden frame, generally rather over 1 foot in length, about 8 inches broad and 3 or 4 inches deep, and securing it in position by nails or wooden pegs driven through it into the wood. Transverse and longitudinal straight lines are then drawn on the lower surface of leather, intersecting one another in such a way as to form square interstices, in each of which an equal number of holes is made with a heated metal point. Such sieves are still made and used, but it is more common now to employ perforated zinc in their construction than leather.

Both in the Faroes and on the Icelandic coasts the skins of sheep and seals are employed as floats for fishing nets in the sea, the animal being skinned through the neck (the head having been cut off), and all other apertures being sewn up. The skin is then inflated and dried, freed from hairs, covered when dry with a thick layer of tar, and finally kept in an inflated condition by means of a wooden peg tightly bound into the aperture left. In the Faroes the stomach of the Pilot Whale is frequently treated in a similar fashion and used for the same purpose, while in Iceland the skins of young seals, taken off in the same way, but stuffed instead of being inflated, and having the hair left on them instead of being tarred, are made into wallets, which resemble the water-skins so common in Oriental countries. They are slung over the shoulders by means of a woollen rope tied round the tail and the neck, through which the objects to be carried are inserted. I have seen similar wallets in the Faroes, but believe that they were imported from Iceland, as seals, except those that merely come south from the Arctic in winter, have been exterminated in the Faroes, a price having been put on their heads for the benefit of the fisheries.

The stomachs of large halibuts, cleaned and treated in much the same way, but without strings, are sometimes employed by Farish women to hold carded wool.

The household broom of the Faroes, where it is also used for sweeping meal from the quern tray into baskets, is made by drying a pair of puffin's wings and sewing them together, generally with wool, along the outer edges, in very much the same way as hand-screens are often made out of birds' wings in this country except that no handle is added, the proximal extremities of the bones taking its place. I have seen a similar broom, made out of a fowl's wings, in the Malay Peninsula.

The Icelandic "skin windows"[1] may be mentioned here, although they are now quite obsolete, and were not really made of skin, but of the placenta of a cow. This substance becomes, when dried, white and translucent, and was formerly used for admitting light into the houses, being stretched over hoops, which were made of strips of matchwood bent round in a circle and kept in this position by having the ends sewed together, either with sinews or with the roots of bleaberries or other plants. They were fitted tightly into holes cut in the roof for their reception. Old men in the Westmann Isles, one of whom made me the model on which this description is based, told me that the "skin windows" had this advantage over glass, that if torn by the wind they could be sewn together again.

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[1] Cf. Cleasby, *Icelandic-English Dictionary*, p. 552, *sub voce*, *skjár*.

BASKETS AND CREELS.

Very little basketwork is made either in Iceland or the Faroes, probably through scarcity of suitable materials, but the few specimens that I have been able to obtain are interesting. Those that I have seen in the Faroes have all been made of straw, which has been built up in a spiral and fastened together by means of string, woven in and out between the coils; sometimes they have been bound with leather or hide round the base. So far as I am aware, these baskets only assume two shapes, one of which is squat and inclined to be globular, while the other, fundamentally of the same form, is provided with a wide lip or spout at one side in order to facilitate the pouring out of its contents (Pl. XXV, 11). Specimens of the latter type are highly prized, as being difficult to make. The size varies considerably, being dependent on the number of persons in the household in which the basket is used, for in families in which the hand-quern is still employed it is customary to grind just sufficient corn for one day's use every morning, and a basket is made which will hold the correct amount of grain, the meal being subsequently swept back into it. The only basket of Icelandic manufacture that I have seen is one obtained in 1898 in the Rangarval district and used by an old woman to hold odds and ends (Pl. XXV, 12). It resembles the simpler Farish type in shape and is made on the same principle, but both warp and woof consist of pieces of root, probably that of the bleaberry, which have been freed of their bark and pared down to the requisite thickness.

So closely do the shapes of these baskets resemble those of vessels modelled in clay, that I was inclined to believe that they had actually been moulded round some such object, but I was told, on inquiry, that they were made entirely by hand without any such adventitious aid, and the makers assured me that they did not consciously copy anything but other baskets. It is noteworthy, however that pottery of a rude type, probably resembling that of the Outer Hebrides, was formerly made on the little island of Kolter[1] in the Faroes, though none, so far as I can learn, is now manufactured either in Iceland or in these islands.

The creels in which the Faroe people carry peat, fish, wool, etc., on their backs are not baskets, but may, for the sake of convenience, be considered here. They are made of laths of wood nailed, at some distance apart from one another, to a wooden framework, and are carried by means of a pair of ropes, which are attached at one end to the two uprights of the framework on one side, and at the other end to a woollen band, either knitted or woven, which passes across the forehead of the bearer. Some have a contrivance by which the bottom can be removed, but this appears to be less common than formerly. There is a good figure, and a detailed description, in Landt (pp. 278, 280, Plate III, Fig. 1).

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[1] Landt, *l.c.*, p. 137.

The theoretical interest of the objects and usages described above is twofold; in the first place they illustrate the fact that implements of an extremely primitive character may survive in daily use among a people who have attained a high culture, but have been isolated by their geographical position; in the second, they afford some curious examples of the independent evolution of simple types in very different environments. Among them are a stone hammer resembling a war club from New Guinea, a fish-carrier paralleled by one from South America, a toy made also, of different materials, by races as diverse as the Malays and the English, as well as by the Nicobarese and others, and shoes approximating to a North American type; nor in any one of these instances can a historical connection be even suggested, while in at least one, that of the fish-carrier, it is not possible to point to the occurrence of parallel types in intermediate geographical regions. The more complicated indigenous implements of the Faroes and South Iceland, such as those employed in agriculture, the manufacture of wool and string, and in lighting, with all of which I hope to deal in a subsequent communication, naturally illustrate the first point more closely than the second, being mostly survivals from a former epoch and at one time of comparatively wide distribution.

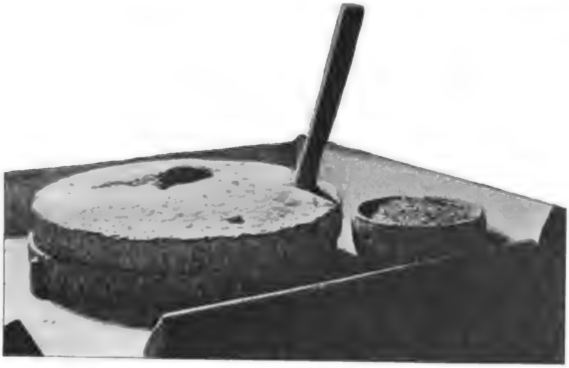
Explanation of Plate.

PLATE XXV.

Fig. 1.—Stone hammer, used in pounding dried fish. Reykjavik, Iceland.
Fig. 2.—Corn quern, with tray and basket of barley. Naalsoe, Faroes.
Fig. 3.—Spindle, with whorl made from the head of the femur of a pony. Thorshavn, Faroes.
Fig. 4.—Bone skate (lower surface), made from whale's rib. Westmann Isles, South Iceland.
Fig. 5.—Splinter of bone, used in pegging out skins. Landeyja, South Iceland.
Fig. 6.—Bone pliers, used in sewing leather. Landeyja, South Iceland.
Fig. 7.—Bone fish-carrier. Landeyja, South Iceland.
Fig. 8.—Sinker for salmon-net. Leykmot, Iceland.
Fig. 9.—Half of lower jaw of Pilot Whale (*Globicephalus melas*), used as shovel. Kvivig, Stromoe, Faroes.
Fig. 10.—Model of tormentil pounder as formerly used. Kvivig, Stromoe, Faroes.
Fig. 11.—Corn-basket of straw. Naalsoe, Faroes.
Fig. 12.—Work-basket of roots. Landeyja, South Iceland.
Fig. 13.—Fishing-line, with stone sinker. Thorshavn, Faroes.

Fig. 10 is from a specimen in the National Museum of Scottish Antiquities: the remaining specimens illustrated, with the exception of the quern, which was photographed *in situ*, are in the Pitt-Rivers Museum at Oxford.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, *Plate XXV.*



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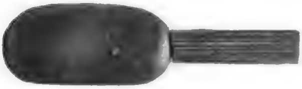

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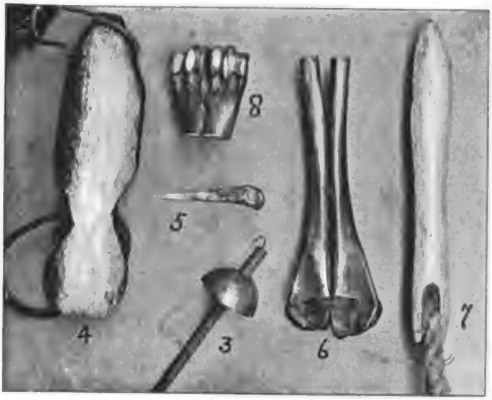

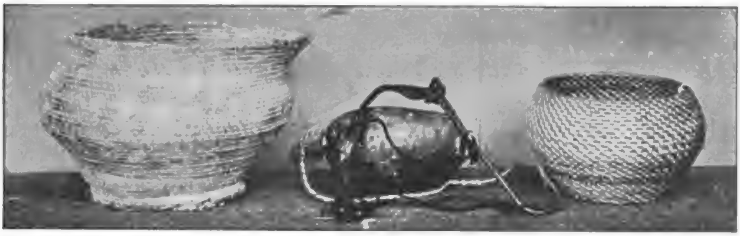

11. 13. 12.

PRIMITIVE IMPLEMENTS IN THE FAROES AND SOUTH ICELAND.

LANGUAGES OF THE KAMILAROI AND OTHER ABORIGINAL TRIBES OF NEW SOUTH WALES.

By R. H. Mathews, L.S., Associé Étranger Soc. d'Anthrop. de Paris.

Synopsis.—Introductory. Orthography. Grammar of the Kamilaroi Language. Yauan or Mystic Language. The Wallaroi Dialect. The Wirraiarai Dialect. The Guinbrai Dialect. The Darkiñung Language. Conclusion.

Vocabulary of Kamilaroi and Thurrawal Words. Vocabulary of Darkiñung Words.

Appendix.—Some Native Tribes of Victoria, South Australia, and Queensland.

In submitting this short paper it may be stated that, having devoted several years to the study of Australian languages, I hope it will be of value to philologists if I publish some of the results of my labours. In 1901, I contributed to the Royal Society of New South Wales[1] a brief article on the Thurrawal, Gundungurra, and Dharruk languages, spoken by the aborigines of the south-east coast of New South Wales, in which I drew attention to several peculiarities of grammatical structure not previously reported in any Australian tongue. To the languages just mentioned I propose giving the name of the Thurrawal type.

On the present occasion, the Kamilaroi type of language will be dealt with, showing essential points of difference from the Thurrawal, to some of which attention will be drawn.

The Kamilaroi territory may be roughly described as extending from Jerry's Plains on the Hunter River as far as Walgett and Mungindi on the Barwon, taking in the greater part of the basins of the Namoi and Gwydir Rivers.

There are two pronouns in the first person of the dual and plural—one which is used when the person addressed is included, and another which excludes the person addressed (see pronouns). Rev. William Ridley in a short grammar of the Kamilaroi gives two forms in the dual number, but he makes no mention of their existence in the plural, which leads to the inference that they escaped his notice.[2]

Perhaps it should be stated that I was the first author to describe in detail the *Bora*, or initiation ceremonies of the Kamilaroi tribes, having visited and camped with the natives for the purpose of acquiring the information.[3] Their social organization and intermarrying laws were likewise fully described and explained some years ago in my articles on "The Kamilaroi Class System," in several scientific journals.[1]

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[1] *Journ. Roy. Soc. N.S. Wales*, vol. xxxv, pp. 127-160.

[2] *Kamilaroi and Other Australian Languages* (Sydney, 1875), pp. 6, 7.

[3] *Journ. Anthrop. Inst.*, vol. xxiv, pp. 411-417; vol. xxv, pp. 318-339. *Journ. Roy. Soc. Victoria*, vol. ix, new series, pp. 137-173.

ORTHOGRAPHY.

Nineteen letters of the English alphabet are sounded, comprising fourteen consonants and five vowels, namely, *a*, *b*, *d*, *e*, *g*, *h*, *i*, *j*, *k*, *l*, *m*, *n*, *o*, *p*, *r*, *t*, *u*, *w*, and *y*. The system of orthoepy recommended by the circular issued by the Royal Geographical Society, London, has been adhered to as far as possible.

In a few instances I have thought it necessary to introduce the marked vowels *é*, *ó*, and *ú*, to show unmistakably their long sound. Where the short sound of *u* was otherwise doubtful, I have marked it thus, *ŭ*.

It is frequently difficult to distinguish between the short sound of *a* and that of *u*. A thick sound of *i* is occasionally met with, which closely approaches the short sound of *u* or *a*. *G* is hard in all cases. *R* has a rough trilled sound, as in hurrah!

Ng at the beginning of a word, as *ngu* in *ngu'lu*, the forehead, has a peculiar sound, which can be got very closely by putting *u* before it, as *ungu'* and articulating it quickly like one syllable. At the end of a syllable it has substantially the sound of *ng* in the word sing. *W* always commences a syllable or word, and has its ordinary consonant sound in all cases.

The sound of the Spanish *ñ* is frequent, both at the beginning or end of a syllable. *Y*, followed by a vowel, is attached to several consonants, as *dya*, *lyi*, *tyu*, etc., and is pronounced in one syllable, the initial sound of the *d*, *l*, *t*, as the case may require, being retained. *Y* at the beginning of a word or syllable has its ordinary consonant value.

Dh is pronounced nearly as *th* in "that," with an initial sound of *d* preceding it. *Nh* has nearly the sound of *th* in "that," with an initial sound of the *n*. The final *h* is guttural, resembling *ch* in the German word *joch*.

T is interchangeable with *d*; *p* with *b*; and *g* with *k* in most words where these letters are employed. An approach to the sound of *j* is frequently given by the natives, which may be rendered by *dy* or *ty* at the *beginning* of a word or syllable—thus, *dya* or *tya* has very nearly the same sound as *ja*.

In the Thurrawal words in the vocabulary attached to this article, *dy* or *ty* is sounded as one letter, when occurring at the *end* of a syllable or word. Thus, in *birrity*, sick, the last syllable can be pronounced exactly by adding *e* to the *y*, making it *rit-ye*. Then commence articulating the word, including the *y*, but stopping short without sounding the final, or added *e*. *Dy* at the end of a syllable can be pronounced in the same way, the sound of *d* being substituted for that of *t*.

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[1] *Proc. Roy. Geog. Soc. Austral. Q. Bch.*, vol. x, pp. 18–34. *Journ. Roy. Soc. N.S. Wales*, vol. xxxi, pp. 156–168.

In all cases where there is a double consonant, each letter is distinctly enunciated.

ARTICLES.

There are no words strictly corresponding to the English articles, *a* and *the*. The demonstrative adjectives, *this* and *that*, in their various aboriginal forms, supply the place of the definite article.

NOUNS.

Number.—Nouns have no special inflection for the dual and plural numbers, but these are represented by introducing a word meaning two, or several, as follows:—

Singular	A kangaroo	*Bŭndar.*
Dual	A pair of kangaroos	*Bŭndar bular.*
Plural	Several kangaroos	*Bŭndar gunubila.*

Gender.—In the human family different words are used to distinguish the sex, as, *murri*, a man; *inar*, a woman; *birre*, small boy; small girl, *mea*. A child of either sex is *kainggal.*

The gender of animals is denoted by words for "male" and "female" respectively, but these words are different for mammals and birds. *Wumbúrnga*, a buck; *kurrundi*, a doe; *bŭdyer*, a cock; *gunidher*, a hen. *Gunal* is another name for a doe, as *mute gunal*, a female opossum. Another is, *burama ngamumul*, a female dog. A male dog is *mundaia.*

Case.—The principal cases are the nominative, nominative-agent, genitive, instrumental, accusative, dative, and ablative.

Nominative.—*Murri*, a man; *bundar*, a kangaroo.

Nominative-agent.—*Murridu mindere kaui*, a man at a padamelon threw. *Bundaru ngunna mauiñ*, a kangaroo me scratched. *Inaru kainggal bumi*, a woman a child beat.

Genitive.—*Murrigu burran*, a man's boomerang; *inaru buramu*, a woman's dog.

Accusative.—In such expressions as *murridu burama bumi*, a man a dog beat, the accusative remains unaltered.

Instrumental.—When an instrument is the direct object of the verb, it takes a similar suffix to the nominative-agent, thus, *burrandu ngaia karraui*, a boomerang I threw.

Again, when the instrument is the remote object the accusative is unchanged, and the suffix is added to the instrumental case, as, *Ngaia burrandu kainggal bumi*, I with a boomerang a child beat.

Dative.—*Wullai*, a camp. *Wullaidha*, to the camp. *Murridha*, to the man.

Ablative.—*Wullaidhi*, from the camp. *Murridhi*, from the man. *Bundari*, from the kangaroo.

In illustrating the declensions of nouns and adjectives it will be observed that the suffixes vary in the same case, according to the termination of the word to which they are attached, apparently for the sake of euphony. For example, the nominative agent has *du* in some instances, and *u* in others, as *murridu*, *burrandu*, *inaru*, *buralu*, etc. In the genitive case the suffix is *gu* and *u*, as *murrigu*, *inaru*, etc. The suffix to *inar* is the same as that of the nominative agent, the meaning being made clear by the other words of the sentence, as, *inaru mumbal*, a woman's coolamin. In the ablative case *dhi* and *i* are used. The dative has *dha*, *ga*, and *a*.

ADJECTIVES.

Adjectives follow the nouns they qualify, and take the same inflections for number and case.

Nominative.—*Murri bural*, a man large. *Inar dhunggur*, a woman lame.

Nominative agent.—*Murridu buralu kainggal bumulda*, the big man is beating the child.

Genitive.—*Murrigu buralu burran*, the big man's boomerang. *Inaru dhunggguru kunne*, the lame woman's yamstick.

Instrumental.—When an instrument is the remote object of the verb, it requires a suffix, as, *Murridu buralu burrandu kurrawile*, the big man is throwing a boomerang. In such an instance the first suffix is often omitted.

Dative.—*Murridha burala dhaiyannunga*, come to the big man.

Ablative.—*Murridhi burali yannunga*, go away from the big man.

Comparison.—Equality is expressed by saying, *Murruba numma—nungurrage murruba buma*, good this—that other good also. Inferiority is shown by *Num murruba—nungillia guggildul*, this is good—that is no good at all. Or less forcibly, *Murruba numma—nungurrage guggil*, this is good—that is bad. The sense of the superlative is rendered by, *Numma murruba bungan gigilla*, this is the best of all. *Numma gainmurra bungan*, this is the smallest. *Gainmurradyul* means very small. *Bulami* means very large.

When used as predicates, adjectives can be conjugated like intransitive verbs, by using the fitting particles. There is a kind of auxiliary verb, *gilla*, having the sense of "to be" or "to become," which is used with such adjectives. For convenience I will introduce it here, instead of under the heading of verbs.

In the following example, the word *murru*, meaning "good," and also "well in health," will be used.

INDICATIVE MOOD—PRESENT TENSE.

Singular, 1st Person	*Murru ngaia gilla* ...	Good (or well) I am.

PAST TENSE.

Singular, 1st Person	*Murru ngaia ginyi*	Good I was just now.
	Murru ngaia gingén ...	Good I was this morning.
	Murru ngaia gimyén ...	Good I was yesterday.
	Murru ngaia gibbén ...	Good I was some time since.
	Murru ngaia giawillén ...	Good I was long ago.

FUTURE TENSE.

Singular 1st Person	*Murru ngaiala gigi*	Good I will be presently.
	Murru ngaiala gingé	Good I will be to-morrow.
	Murru ngaiala gingurri	Good I will be later on.

IMPERATIVE MOOD.

Singular, 2nd Person	*Murru nginda ginga*	Good thou become (be good).

CONDITIONAL MOOD.

Singular, 1st Person	*Murru ngaia ya gingé*	Good I may become.
	Murru ngaia yelle gingindé	Good if I become.

The remaining persons and numbers of each tense can be obtained by substituting the necessary pronouns, as explained and illustrated in dealing with the verbs in later pages.

It would be better, perhaps, to include the predicative adjectives among the verbs, but I have thought it as well to illustrate them under the present heading, for the purpose of keeping all the adjectives together.

PRONOUNS.

Pronouns have person, number and case, but are without gender. There are two forms in the first person of the dual and plural, for the purpose of expressing the inclusion or exclusion of the person addressed. The nominative pronouns are:—

Singular	1st Person	I	*Ngaia.*
	2nd „	Thou	*Nginda.*
	3rd „	He	*Nguru.*
Dual	1st Person	We, inclusive	*Ngulli.*
		We, exclusive	*Ngullingura.*
	2nd „	You	*Ngindale.*
	3rd „	They	*Ngurugale.*
Plural	1st Person	We, inclusive	*Ngeane.*
		We, exclusive	*Ngeanyel.*
	2nd „	You	*Ngindai.*
	3rd „	They	*Ngurugunnaga.*

The possessive and objective forms of these pronouns are as under:—

Singular	My	*Ngai*	Me	*Ngunna.*
	Thy	*Nginnu*	Thee	*Nginunna.*
	His	*Ngurungu*	Him	*Numma.*

Dual	Ours, incl.	*Ngullingu*	Us, incl.	*Ngullina.*
	Ours, excl.	*Ngullingurungu*	Us, excl.	*Nungullina.*
	Yours	*Nginalingu*	You	*Nginalunna.*
	Theirs	*Ngurungullingu*	Them	*Nummagalena.*
Plural	Ours, incl.	*Ngeanengu*	Us, incl.	*Ngeaninna.*
	Ours, excl.	*Ngeanyellangu*	Us, excl.	*Nganinagunnunga.*
	Yours	*Nginnangu*	You	*Nginanna.*
	Theirs	*Ngurugunnungu*	Them	*Nummagunnunga.*

Relative Pronouns.—The equivalent of these is obtained by such expressions as the following: *Ngar murri nguri yannamyen—burran ngai garamulmyen*, that man away went yesterday—boomerang mine stole yesterday.

Interrogatives.—A few of the interrogatives are: *Nganna*, who? *Ngannu*, whose? *Ngandu bundar bumi*, who the kangaroo hit? *Ngannudnyi*, who from?

Minya, what? *Minyadu nha gimubbi*, what that did? *Minyaguna*, what for? *Minyagu nginda dhai yannawañ*, what for comest thou? *Minyagu nginda yannawain*, what for went thou? *Minyangguddha*, how many times? *Minyungai*, how many?

Demonstratives.—These are in great number and variety, some of which are as follows:—*Nha*, this. *Nuggu*, that. *Nhungurragai*, this other. *Murrangurragai*, that other. *Nhurragwannu*, that farther one. *Nhai wurre*, this (in rear of speaker). *Ngurragudhai*, that (farther this way). *Ngunnundhi*, this (in front of the speaker). On the left of the speaker, *wurragal*. On the right, *thurial*. *Nuddhai*, this way. *Numma*, this fellow (at rest). *Nguruma*, this fellow (in action). *Ngurraberedha*, that (in front). *Nha ngunna kurriduldha*, this touching me. *Ngurriba*, up there.

Indefinite Pronouns.—The following are a few examples:—*Gunubula*, a few. *Guno*, all. *Ngurregedyul*, another.

The following are a few miscellaneous examples in different cases of the pronouns:—*Dhai ngunnanda yannunga*, to me come. *Ngunnandhi yannunga* from me go. *Gai ngai*, child my. *Gaigu ngaiungu*, for my child. *Baina ngai*, father my. *Baindulngu ngaiungu*, for my father.

VERBS.

The termination of the verb differs in each of the tenses, as, *bumulda*, *bumi bumulli*. There are also variations in the past and future tenses to express slight differences in the time, thus, *bumulngén*, did beat this morning, etc. *Bumullingé* will beat to-morrow, etc. (see Conjugation below). These variations are the same in all the persons and numbers of the tense to which they respectively apply. The different numbers and persons are generally indicated by employing the necessary pronoun. For example, *Ngaia bumulda*, I am beating. *Ngulli bumulda*, we (dual inclusive) are beating. *Ngeane bumulda*, we (plural inclusive) are beating. It is therefore evident that each tense form remains constant through all its own persons and numbers. In these respects the Kamilaroi verb differs materially from the Thurrawal and kindred tongues, in which there is a different verbal termination for every person and number throughout each tense.

The auxiliary verb, *gilla*, has already been described in dealing with the adjectives. The moods, tenses, and some of the numerous modifications of verbs will be gathered from the following conjugation of the transitive verb "to beat or strike." The present tense will be given in full, but in the past and future, the first person only will be taken.

ACTIVE VOICE—INDICATIVE MOOD.

PRESENT TENSE.

Singular	1st Person	I beat	*Ngaia bumulda.*
	2nd "	Thou beatest	*Nginda bumulda.*
	3rd "	He beats	*Nguru bumulda.*
Dual	1st Person	We, incl., beat	*Ngulli bumulda.*
		We, excl., beat	*Ngullinguru bumulda.*
	2nd "	You beat	*Ngindale bumulda.*
	3rd "	They beat	*Ngurugale bumulda.*
Plural	1st Person	We, incl., beat	*Ngeane bumulda.*
		We, excl., beat	*Ngeanyel bumulda.*
	2nd "	You beat	*Ngindai bumulda.*
	3rd "	They beat	*Ngurugunnaga bumulda.*

PAST TENSE.

Singular, 1st Person	I beat just now	*Ngaia bumi.*
	I beat this morning	*Ngaia bumulngén.*
	I beat yesterday	*Ngaia bumulmyén.*
	I beat some time since	*Ngaia bumullên.*
	I beat long ago	*Ngaia bumullawillên.*

These five variations of the verb are repeated for each of the two remaining persons of the singular, for all persons of the dual, and for all the persons of the plural, by merely substituting, in succession, the requisite pronouns, *nginda*, *nguru*, *ngulli*, and so on. See table of pronouns.

FUTURE TENSE.

Singular, 1st Person	I will beat presently	*Ngaiala bumulli.*
	I will beat to-morrow	*Ngaiala bumullingé.*
	I will beat at a future time	*Ngaiala bumullingurri.*

and so on through all the persons and numbers. It will be observed that the pronoun *ngaia* becomes *ngaiala* in the future tense.

IMPERATIVE MOOD—PRESENT TENSE.

Singular	Beat thou	*Nginda bumulla.*
Dual	Beat you	*Ngindale bumulla.*
Plural	Beat you	*Ngindai bumulla.*

The negative form is:—

Singular	Beat thou not	*Kurriandu bumulla.*
Dual	Beat you not	*Kurriandale bumulla.*
Plural	Beat you not	*Kurriandai bumulla.*

also, *Kurriaguil bumulla*, do not continue to beat, or cease beating.

FUTURE TENSE.

Singular	Let him beat	*Nguruwunna bumulli.*
Dual	Let them beat	*Nguruwunnagale bumulli.*
Plural	Let them beat	*Nguruwunnagunnaga bumulli.*

Other expressions are:—*Ngaia bumullinga*, let me beat (him, or as the case may be). *Ngulli gurri bumunnami*, we, (dual inclusive) may as well also beat (him, etc).

CONDITIONAL MOOD—PAST TENSE.

1st Person Singular.	I may have beaten	*Ngaia ya bumi.*

FUTURE TENSE.

1st Person Singular.	Perhaps I will beat	*Ngaia wuddhai ya bumulli.*

MIDDLE VOICE—INDICATIVE MOOD.

PRESENT TENSE.

1st Person Singular.	I am beating myself	*Ngaia bumaingilda.*

PAST TENSE.

1st Person Singular.	I beat myself	*Ngaia bumaingilingén.*

FUTURE TENSE.

1st Person Singular.	I will beat myself	*Ngaila bumaingili.*

The above verbs are the same for all the persons and numbers

IMPERATIVE MOOD.

2nd Person Singular. Beat thou thyself. *Nginda bumaingilia.* The negative is, *Kurriandu bumaingilia*, beat not thyself.

Reciprocal.—There is a reciprocal form of the verb in the dual and plural.

Present	We are beating each other	*Ngulli bumullela.*
Past	We beat each other	*Ngulli bumulluñ.*
Future	We will beat each other	*Ngulli bumullé.*

Various shades of meaning are obtained by modifications of the verb, and by additional words, of which the following are a few examples:—

I beat again, *Ngaia bumulluiñ.*
I will beat (after some event), *Ilanu ngaia bumadhiale.*
Beat first (before some event), *Bumunummia wurrea.*
I will continue beating, *Ngaiala bumuldé yuggaduddha.*
Beat again, *Yalu bumaluia.*
Beat on behalf of another, *Bumullandhummi.*
I am beating long, *Guril ngaia bumulda.*
I beat severely, *Bumba ngaia bumulngén.*

If a man or any living creature be lying, say, on the ground, the natives use *babilla*, but if the object lying be inanimate, they express it by *wila*. For example, *Ngaia babilla*, I am lying. *Burran wila*, a boomerang lies.

Some verbs can take terminations expressing the dual and plural, thus:—

Bumullainyillila, which means that a couple of persons are doing the beating. *Bumullabuldha*, shows that several are beating.

Yannungillawan, two walking. *Yannawabalan*, several walking.

Gwallingillila, two persons talking. *Gwallawabuldha*, several persons talking.

Babingillila, two lying. *Babiabuldha*, several lying.

Ngurringillila, two sitting. *Ngurriabuldha*, several sitting.

Bundar ngaia ngummi, I saw a kangaroo. *Buriabu ngindaiyu yannawa ngummillindhai*, all of you go and see.

There is no form for the passive voice, but its place is supplied by changing the sentence from the passive to the active form; thus, "A woman was stung by a scorpion," would be expressed, "A scorpion stung the woman." This example also shows how a sentence which comes under the ablative case in English, is expressed in Kamilaroi by means of the accusative.

PREPOSITIONS.

In front, *wurre.* Behind, *boadhe.* At my camp, *ngar ngaiaga wullaidha.* Between two trees, *dhului bulari biddhundi.* *Mulandha buggadha*, the other side of the river. *Ngurealino buggadhi*, this side of the river. *Iri ngaia dhai buggadhi barin*, from the other side the river I crossed over. *Ngaia yudile wuruñ*, I went through the scrub. *Mute ngurriba kubburunda dhuluo*, an opossum is up in the top of the tree. *Ngurriba ngaiala dhuyuli gulliawan*, I am going up the hill. *Ngudda ngaiala dhuyuli yarrian*, I am going down the hill. *Murru ngaiadhai mulandha dhulua yanne*, I will walk round the tree. *Dhului ngaia gulle*, I will climb up the tree. *Thurrawullai wullaiga*, go home to the camp. *Ngurunguma wullaigu*, it belongs to this camp. *Ngungaraguli*, beyond you. *Nhirrindo dhuyuli*, along the side of the hill.

Adverbs.

Of time—Now, *yilladhu.* Soon, *ila.* Early morning, *bungarabi.* This evening, *bulului.* Yesterday, *yilagimyén.* To-morrow, *ngurugo.* Long ago, *yilambu.* By and bye, *yirala.* Sometime, *yiralea wuddhai.* Always, *yellimowungger.* Again, *yalu.* Formerly, *gibbailandhé.*

Of Affirmation and Negation.—Yes, *yo.* No, *kummil.* True or certain, *giru.* Nothing, *guniel.* Perhaps, *yâwawunna.*

Of Interrogation.—Where, *thulla?* Which (or where) is the best, *thulla wurragal murruba?* How, *gwirrar?* When, *warru?* Where is thy camp, *thulla wullai nginnu?*

Of Place.—Here, *ngua.* There, *ngurragu.* Inside, *mudhuga.* Outside, *guzialla.* Near, *gwunba.* Far, *ngarribu.* Yonder, *ngar-ngar.* Beyond that, *ngaraguguddhera.* Farther still, *ngarribirragu.* More this way, *nubbodhai.* Round this way *murrugumadhai.* *Dhai*, a suffix to different words, meaning "coming this way."

Of Quality.—Slowly, *gureba.* Quickly, *kullier.* Well, *murru.*

Of Quantity.—I have a little, *nungaia gainmurra.* A little, *burungai.* Plenty, *budela*, or *murrumurru.*

Of Number.—Once, *mala.* Twice, *bulara.* Several times, often, *budlaga.* First, *wurrea.* Last, *ngurra.* Few in number, *gunabilla.* More, *yalu.* Only, *yel.* Together, *kallano.*

The comparison of adverbs is similar to that of adjectives. *Kullier birre bunnagan—murri gureba bunnagain*, quickly the boy ran—slowly the man ran.

Interjections and Exclamations.

Ya! calling attention to one person; *yagale!* two, and *ya-ya-gunna*, if several are called. *Nuggwa!* look out. *Wirro wirrò!* well-well. *Ngibai!* surprise. *Ngurradhul!* pity. *Kurria!* cease. *Chuh!* silence.

The men have three curious exclamations which they use when playing about or talking among the women. *Ngi-nge!* copulation. *Kutthabul!* noise of the friction while copulating. *Barribundi!* emission.

Numerals.

One, *mal.* Two, *bular.* Three, *guliba.*

Conjunctions.

Conjunctions are few and unimportant. *Yamma* and *yelle* appear to have the sense of "if."

Note.—It should perhaps be mentioned that in all the expressions illustrating the several grammatical cases in the Kamilaroi and other languages herein described, the demonstrative pronouns are purposely omitted, for the two-fold object of saving space, and avoiding confusion by introducing any more words than the sentence really required. For example, where I have given "*Murridu mindere kawai*" (man at padamelon threw), would be expressed by the black fellow: "This man-in-front at yonder-on-left padamelon threw," or as the subject might require.

These remarks apply to every example of aboriginal sentences throughout the several languages contained in this article.

THE YAUAN, OR MYSTIC LANGUAGE.

In a former communication, in 1896, I mentioned the existence, among the Wiradthuri tribes, of a secret language, known only to the initiated.[1] The Kamilaroi likewise possess a mystic tongue, called Yauan, which is inculcated at the Bora ceremonies.

It is difficult to assign a reason for this language, because it is never used in the presence of women or children, but is spoken exclusively by the men when carrying out the ceremonies of initiation. It is possibly a typical remnant of the language of earlier or conquering tribes in the remote past; and whether this be so or not, its preservation is of the utmost importance to the ethnologist and linguist.

At present I shall offer only a limited number of words and expressions, but on a future occasion I hope to treat the matter more fully. The following are a few representative words and phrases:—

THE HUMAN SUBJECT.

A man	*Maimbung.*	Ear	*Binéyulaui.*
An old man	*Muddhagala.*	Mouth	*Ngaimballumbu.*
A clever man	*Gŭndaidhar.*	Teeth	*Yirrambunna.*
Father	*Muddhamunna.*	Thigh	*Gunnimbar.*
Elder brother	*Muddhunga.*	Foot	*Gungo.*
A woman	*Winnilwanga.*	Penis	*Dhûnburringa.*
An old woman	*Yambuli.*	Testicles	*Burumbunna.*
Head	*Kubbadhirba.*	Vulva	*Biddheru.*
Forehead	*Ngulumblal.*	Vagina	*Wûngodhe.*
Hair of head	*Budhulbudhulnga.*	Anus	*Murumburringa.*
Eye	*Millungga.*	Sexual desire	*Dharmu.*
Nose	*Murrunggŭn.*	Copulation	*Wungogurrilla.*

ANIMALS, NATURAL OBJECTS, ETC.

Dog	*Bingŭrnga* or *Gûngumôal.*	Eaglehawk	*Dhindurringa.*
		Iguana	*Birridhunbitlirnga.*
Opossum	*Birridhurraburai.*	Boomerang	*Wanggarribŭl.*
Kangaroo	*Ungogirgal.*	Camp	*Nyimarai.*
Carpet Snake	*Milingulli.*	Fire	*Bûngumurragan.*
Emu	*Illillimbai* and *Ungodhulli.*	Smoke	*Thugabill.*
		Water	*Wungothubbil.*

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[1] "The Bûrbŭng of the Wiradthuri Tribes," *Journ. Anthrop. Inst.* xxv, p. 310.

Any tree ...	*Buddhabulli.*	String ..	*Warranggan.*
Wood ...	*Birgilnga.*	Camp of old men ...	*Ungomarai.*
Stone ...	*Wallamara.*		
Bone	*Bûnganna.*		

WORDS AND PHRASES.

Swim, *wurunge.* Be quick, *birrigunni.* To break a bough off a tree, *wugangummil.* To shout at a distance, *kaimbulnga.*

Ungomile, maiambanga wûnggwallandha, behold, a man is going along.

Winnilwanga wûnggwallandha, a woman is going along.

Wûnggwalliwan, he is coming this way.

Wûnggwadi, he is going away.

Wunggwalliwadhai, you can go away.

Ungomarai ûngobillegu, I am going to camp.

Nyimarai wunggowi, I am going to bed.

Ungogurrili yauanda, let us dance on the turf.

Ungomile buddhabulli, look at the trees.

WALLARAI, WIRRAIARAI, AND GUINBRAI DIALECTS.

The Wirraiarai and Wallarai are neighbouring tribes adjoining the Kamilaroi towards the north. The Guinbrai tribe is located about Gunnedah. By personal investigation among the natives of each of these tribes I have satisfied myself that the grammatical structure of their language is the same as that of the Kamilaroi of which they are merely dialects. Their rules for the declension of nouns and adjectives are substantially the same; their pronouns and verbs are inflected in a similar manner; their modes of dealing with the other parts of speech are equally concordant. Some of the words of their vocabulary are almost identical, whilst many are quite different. The following are a few examples in each dialect, by which it will be seen that their grammar is practically a repetition of the Kamilaroi.

Wallarai Dialect.—Wal, no. *Yo,* yes. *Dên*, a man. *Inar*, a woman. *Birrai*, a small boy. *Miai*, a little girl. *Gui*, an opossum. *Gui yerragurai*, a male opossum. *Gui gunidher*, a female opossum. *Dên bural*, a large man. *Dên yambuli*, a very big man. *Dêngu burrallu burran*, a big man's boomerang. *Inaru burallu kannai*, a big woman's yamstick.

Wirraiarai Dialect.—Wirra, no. *Yo,* yes. *Bundar* a kangaroo; *bundar bular*, a couple of kangaroos; *bundar bûnlaba*, several kangaroos. *Mai*, a man. *Mugga*, an opossum. *Buruma*, a dog. *Mai bunal*, a big man. *Maidhu bunalu mugga bumi*, a big man an opossum struck. *Burumo mugga bŭthe*, a dog bit an opossum. *Bundaru gulâwan*, the kangaroo jumps. *Maigu bunalu burran*, a big man's boomerang.

Guinbrai Dialect.—Guin, no. *Yo,* yes. *Giwir*, a man. *Inar*, a woman. *Bundar*, a kangaroo. *Gui*, an opossum. *Gunnai*, a yamstick. *Gulir*, a spouse. *Bumai*, a boomerang. *Wallumbun*, a padamelon. *Burrai*, a wallaby. *Bumaiba ngai*, boomerang mine. *Gulira ngai*, wife mine. *Gunnaiba ngai*, yamstick mine.

I have not thought it necessary to give examples of the verbs or pronouns in these three dialects since, as already stated, they are similar to the Kamilaroi.

THE DARKIÑUNG LANGUAGE.

The Darkiñung speaking people adjoined the Kamilaroi on the south-east and occupied a considerable range of country in the counties of Hunter, Northumberland and Cook, extending from Wilberforce and Wiseman's Ferry on the Hawkesbury river, to Jerry's Plains and Singleton on the Hunter, and including the basins of the Colo and Macdonald rivers, Wollombi Brook and other streams. On the south they were met by the Gundungurra and Dharruk tribes, whose languages have been reported by me elsewhere.[1]

A detailed account of "The Bûrbung of the Darkiñung Tribes" was contributed by me to the Royal Society of Victoria in 1897[2]—the first and only report extant of their initiation ceremonies. Their division into four intermarrying sections and their laws of descent were dealt with by me in a communication to the Royal Society of New South Wales in 1897.[3]

It is hoped that the following abstract of the Darkiñung grammar will be found of interest and value, because it shows affinities with the Kamilaroi on the one side, and with the Dharruk on the other. The information was obtained by me by personal inquiries among the few old natives who still speak their own dialect.

NOUNS.

Number.—Nouns have the singular, dual and plural numbers. *Mirri*, a dog; *mirribulla*, a couple of dogs; *mirribiñ*, several dogs.

Gender.—*Kuri*, a man; *ñukung*, a woman; *wungara*, a boy; *mirkan*, a girl The gender of animals is indicated by an additional word—*gaual* for the male, and *nguppal* denoting the female, thus, *kuluwañ gaual*, a male native bear, and *kuluwañ nguppal*, a female.

Case.—The nominative has two forms, one of which merely names the subject, as *ñukung*, a woman; *kuri*, a man; *girribil*, an opossum; *barkan*, a boomerang. The other form represents the subject in action, as, *ñukungga wukkur manai*, the woman a perch caught. *Kuria, gujagang buñbai*, the man a child beat. *Girribilla girrang bondalitti*, the opossum is eating leaves. It will be observed that the suffixed particle varies with the termination of the word to which it is attached.

The accusative. The foregoing three examples likewise serve to illustrate the accusative case, showing that it is the same as the simple nominative.

Instrumental. When an instrument is used in the action described in the verb, a suffix is required, as, *kuria barkanda binggibai*, the man a boomerang threw.

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[1] "The Gundungurra Language," *Journ. Roy. Soc. N.S. Wales*, vol. xxxv, pp. 151–155. "The Dharruk Language and Vocabulary," *op. cit.*, pp. 155–160.

[2] *Proc. Roy. Soc. Victoria*, vol. ix, new series, pp. 1–12.

[3] *Journ. Roy. Soc. N.S. Wales*, vol. xxxi, pp. 170–171.

The possessive. *N̄ukunggai gunnai*, a woman's yamstick; *kurigai barkan*, a man's boomerang.

The dative. *Ngurragu yanna*, to the camp come.

The ablative. *Ngurrabirrang warri yanna*, from the camp go away. *Barkan dutagurbirrang bungaiwa*, a boomerang out of myrtle made I.

ADJECTIVES.

An adjective takes the same inflections for number and case as the qualified noun, which it follows.

Girribil dúnggang, an opossum large. *Girribilla dúnggangga girrang bondalitti*, a large opossum is eating leaves.

Possessive. *Kurigai gŭlgŭlgai barkan*, a strong man's boomerang.

The dative and ablative cases are expressed by means of their respective suffixes applied to the adjective and noun.

The comparison of adjectives, and their inflection like intransitive verbs in certain instances, are analogous to the Kamilaroi.

PRONOUNS.

Pronouns have number, person, gender and case, as in the following table of pronouns in the nominative. They contain two forms of the first person in the dual and plual numbers.

Singular	1st Person ...	I	... *Ngaia.*
	2nd „ ...	Thou ...	... *Nginda.*
	3rd „ ...	He ...	... *Nyua.*
	3rd „ ...	She ...	... *Nondwa.*
Dual	1st Person ...	we, incl. ...	... *Ngullia.*
		we, excl. ...	... *Ngungullia.*
	2nd „ ...	you ...	... *Bullabun.*
	3rd „ ...	they ...	... *Bulloara.*
Plural	1st Person ...	we, incl. ...	... *Ngeang.*
		we, excl. ...	... *Ngeangwai.*
	2nd „ ...	you ...	... *Nyurabiñ.*
	3rd „ ...	they ...	... *Gurigalgang.*

It will perhaps be sufficient to furnish the possessive and objective forms of the singular number only, as under:—

1st Person ...	mine	*Jannunggai*	...	me ...	*Janna.*
2nd „ ...	thine	*Nginnunggai.*	...	thee ...	*Nginna.*
3rd „ masc. ...	his ...	*Noanggai.*	...	him ...	*Nana.*
3rd „ fem. ...	hers ...	*Nonanggai.*	...	her ...	*Nonoan.*

There are other terminations, indicating "to me," "with me," etc. See also the verbal suffixes.

I was unable to discover any forms for the feminine in the third person of the dual and plural pronouns—an additional word distinguishing the gender being employed.

Interrogatives. *Ngan*, who (singular)? *Nganbulla*, who (dual)? *Nganbin*, who (several)? *Nganda*, who (did it)? *Ngannunggai*, whose (is this)? *Nganwurribirrang*, who from?

Méing, what? *Méingga*, what (did it)? *Méinggu*, what for? *Ményan*, how many? *Mémbai*, what is the matter?

Demonstratives. *Dhi*, this. *Dhale*, that. There are several variations of these, according to their position in regard to the speaker.

VERBS.

Verbs have the same moods and tenses as the Kamilaroi. The form of the verb remains constant throughout each tense, the person and number being shown by a suffixed particle in the singular, and by a fitting pronoun in the dual and plural, as in the following conjugation of the verb *bonda*, to eat.

INDICATIVE MOOD. PRESENT TENSE.

Singular	1st Person		I eat	*Bondalittiwah.*
	2nd ,,		Thou eatest	*Bondalittiwi.*
	3rd ,,	masc.	He eats	*Bondalittinoa.*
	3rd ,,	fem.	She eats	*Bondalittinonda.*

Dual. 1st person we, incl., eat, *Ngullia bondalitti*, and so on through the remaining persons, by taking the suitable pronoun from the table of pronouns given in an earlier page.

Plural. 1st person we, incl., eat, *Ngeang bondalitti*, and so on for all the persons, as in the dual.

PAST TENSE.

Singular	I ate	*Bondaiwah.*
Dual	we, incl., ate	*Ngullia bondai.*
Plural	we, incl., ate	*Ngeang bondai.*

FUTURE TENSE.

Singular	I will eat	*Bondamuttiwah.*
Dual	we, incl., will eat	*Ngullia bondamutti.*
Plural	we, incl., will eat	*Ngeang bondamutti.*

All the persons of the past and future tenses can be supplied by following the rules stated under the present tense. The pronominal suffixes—*wah* or *bah*, *wi*, *noa* and *nonda*—given in the singular number of the present tense, are also used in the singular number of the past and future.

IMPERATIVE MOOD.

Singular ...	2nd Person ...	Eat thou ...	*Bondawi.*
Dual ...	„ ...	Eat you ...	*Bonda bullabun.*
Plural ...	„ ...	Eat you ...	*Bonda nyurabiñ.*

The negative consists of adding the word *bûndi* after the verb, as, *bondawi bûndi*, eat thou not. The conditional mood, the middle voice, modifications of the verb to express various shades of meaning, etc., are passed over.

The verb "to be" has its equivalent in the word *guyung*, which may be used with either an adjective or suitable adverb as a predicate, thus, I am good, I am here, etc. Good am I, *yutta guyungbah.* Good I was, *yutta guyungbaiwah.* Good will be I, *yutta guyungbaimbah.* The other persons and numbers can be supplied in the manner already explained in the conjugation of the verb "to eat."

In the last example, and in many other words, the pronominal suffix *wah* is changed to *bah* for the sake of euphony, according to the termination of the word with which it is used.

ADVERBS.

Yes, *ngé.* No, *warpai.* Now, *wirrai.* Soon, *gubbo.* By and bye, *gubbowarraiu.* A long time, *guruwurrung.* Always, *guraiñ.* Yesterday, *burpindu.* Morning, *burpingal.* Evening, *warragal.* To-morrow, *burrang.*

Where, *wáng?* Where is the camp, *wámbi ngurra?* Where from, *wánbirrung?* Where is he, *wángwurrai?* How, *yalingawai?* When, *warrunga?*

Slowly, *warral.* Quickly, *ngát.* Badly, *gujalang.* Often, *guraindya.*

Here, *diang.* There, *diwunnia.* Far away, *wurri.* Yonder, *gauinda.* Hither, *dengtain.*

PREPOSITIONS.

Around, *warwargutti.* Between, *willigoa.* To go over, *kulliwai.* On, or on top of, a hill, *garru bulpoa.* Over, or on other side of, a hill, *gullaiaba bulpoa.* Inside, *guri.* Outside, *bukkawa.* In front, *warrukun.* Behind, *waliung.* In the midst, *dhuluga.*

INTERJECTIONS.

Mah! calling attention. *Gwak!* take care. *Yappal!* exclamation of sorrow.

NUMERALS.

One, *wakul.* Two, *bulla.* Several, *gurai.*

CONCLUSION.

In the foregoing pages I have endeavoured to record and preserve the grammatical elements of some of the most important aboriginal languages of New South Wales.

When first entering upon this work it was found to posses no literature beyond a few meagre vocabularies, and all my information had to be obtained orally from the natives by visiting them at their camping places. The whole of this work has been done by myself alone, without the assistance of any person, either in collecting the vocabularies or in preparing the grammars. It is perhaps too much to expect that the details of so many languages and the materials of three vocabularies should be free from omissions and mistakes, especially when the immense geographic area dealt with is taken into consideration.

Now that I have overcome the initial difficulties of laying down the elements of several aboriginal tongues, the further study of Australian languages will be rendered comparatively easy to other investigators.

VOCABULARY OF KAMILAROI AND THURRAWAL WORDS.

In the following vocabulary, containing about 900 words, I have given the English in the first column, and have grouped together words of the same character as the human body, inanimte natural objects, different animals, and also adjectives and verbs. The Thurrawal equivalents of the Kamilaroi are supplied in the third column to facilitate comparisons in both languages. When I prepared my article on the "Thurrawal Language," referred to in the opening paragraph, I had not leisure to prepare a vocabulary of its words,[1] but have since completed that task, and have therefore now incorporated it with the present work.

Every word of the Kamilaroi in this vocabulary, as well as every Thurrawal word, has been taken down by myself alone, from the lips of the native speakers.

THE FAMILY.

English.	*Kamilaroi.*	*Thurrawal.*
Man, collectively	*murri*	*yuiñbuloala.*
A man	*giwir* or *murri*	*yuiñ.*
An old man	*waiama*	*bangang.*
Husband	*gulimunga*	*dhullinmurra.*
Clever man	*wirringan*	*winnangalang.*
Youth, before bora	*wommorai*	*yangobadyang.*
Youth, just passed bora.	*tuggabilla*	*wurugalgang.*
Youth, any time after bora.	*kubbora*	*wurugal.*
Small boy	*birre*	*buubari.*
Male child	*birredyul*	*burijerra.*
A woman	*inar*	*ngurrunggal* or *mega.*
Old woman	*yambolinya*	*muldha.*
Wife	*guliran*	*megamurra.*
Girl, till puberty	*mea*	*ngubba.*
Female child	*meadyul*	*jiramañ.*
Child of either sex	*kainggall* or *kogadhi.*	*gujagang.*
Father	*baina*	*baba.*
Mother	*ngumba*	*ngubbung.*
Elder brother, before bora.	*tuggandi*	*dyadyang.*
Elder brother, after bora.	*daiadhi.*	
Younger brother, before bora.	*kullaminga*	*nyammañ.*
Younger brother, after bora.	*kullamai.*	
Elder sister, before puberty.	*buggandi*	*mamang.*
Elder sister, after puberty.	*boadhi.*	
Younger sister, before puberty.	*burrianga*	*midyang.*
Younger sister, after puberty.	*burrian.*	
Mother in-law	*karremai*	*nanari*
Son-in-law	*wuramai*	*báwiri*

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[1] *Journ. Roy. Soc. N.S. Wales*, vol. xxxv, p. 128.

THE HUMAN BODY.

English.	*Kamilaroi.*	*Thurrawal.*
Head	*koga*	*wollar.*
Forehead	*ngulu*	*ngulu.*
Hair of head	*kah*	*jirrar.*
Beard	*yerre*	*wallu.*
Moustache	*mündhu*	*yerrañ.*
Eye	*mill*	*meh.*
Eyes when shut	*mugaginne*	*mili.*
Eyebrow	*ngirr*	*maii* or *drumme.*
Eyelash	*thinmir.*	
Nose	*muru*	*nugur.*
Nostril	*murubirru*	*nugurgumirru.*
Cheek	*buddhal*	*birra*
Neck	*nun*	*guru.*
Throat	*wüngui*	*ngurauñ.*
Ear	*binna*	*guri.*
Mouth	*ngaih*	*kummi.*
Lips	*gumai*	*illing.*
Liver	*kunna*	*nuggunung.*
Tongue	*thulle*	*dhallañ.*
Kidneys	*mugar*	*urirraung.*
Teeth	*yira*	*irra.*
Chin	*yerre*	*wallu.*
Breast, female	*biri*	*ngumminyang.*
Chest	*ngubi*	*yelga.*
Navel	*bigal*	*nyirra.*
Navel-string	*ngalir*	*nyirrich.*
Afterbirth	*wanguli*	*ñadyuang* or *nguranhung.*
Belly	*mubal*	*bindhi.*
Rump	*murumbür*	*kaguwulali.*
Anus	*nyi*	*büng.*
Flank	*nhurriu*	*munung.*
Back-bone	*guriu*	*balganung.*
Back	*bo*	*belga.*
Human voice	*gurrai.*	
Penis	*dhun*	*burnda.*
Glans penis	*nyiume*	*gulanang.*
Meatus urinarius	*dhunbirru*	*burndagumirru.*
Foreskin	*nyinmaia*	*bugganyung.*
Erection	*guwurre*	*burndawurri.*
Semen	*barri*	*minnung.*
Testicles	*buru*	*gulga* or *mura.*
Vulva	*yangal*	*millang.*
Labia majora	*ili*	*bullu.*

English.	*Kamilaroi.*	*Thurrawal.*
Nymphæ	*binnabinna*	*mundhul.*
Meatus urinarius	*wirra*	*kumir.*
Clitoris	*binnunggal*	*burrunggal.*
Vagina	same as vulva	*burung.*
Hair on pudenda	*budhe*	*murnarain.*
Copulation	*thadha* or *nginge*	*ngurdamai.*
Masturbation	*kaiaiabilla*	*kultaku'tabaili.*
Sexual desire	*ngingin*	*murli.*
Sodomy	*nidudharri*	*bümbuyürdia.*
Urine	*kil*	*jungur.*
Excrement	*guna*	*guning.*
Venereal, in women	*dhumbun*	*warnegang.*
Venereal, in men	*babadi*	
Woman's milk	*ngummu*	*ngumminyang.*
Shoulder	*wollar*	*kagu.*
Shoulder-blade	....	*würdiñ.*
Arm	*bungoon*	*nhurung.*
Elbow	*dhin*	*nguna.*
Armpit	*wurur*	*güdja-güdja*
Hand	*murra*	*murramul.*
Fingers	*murra*	*murramul.*
Little finger	*ngurrabai*	*wurranyung.*
Thumb	*gunidhirba.*	
Finger-nail	*yulumurra*	*birranung.*
Calf of leg	*gowurrawa*	*guullawurru.*
Thigh	*dhurra*	*dhurra.*
Knee	*dhinbir*	*ngumung.*
Knee-cap	*kinbi*	*wulgan.*
Shin	*buyu*	*ngurri.*
Foot	*dhinna*	*dhunna.*
Toes	same as foot	same as foot.
Toe-nails	*dhinnayulu*	*birranung.*
Heel	*dhunga*	*mugga.*
Sole of foot	*gunnaba.*	*nukka.*
Ankle	*ngorh*	*wudda-wudda.*
Ribs	*thurrur*	*binkung.*
Blood	*goai*	*ngaun.*
Fat	*wammu*	*kurainyung.*
Skin	*yulai*	*bugganyung.*
Bone	*bura*	*buyu.*
Intestines	*mubal*	*gungunnung.*
Scar (of wound)	*yurun*	*birring.*

INANIMATE OBJECTS IN NATURE.

English.	*Kamilaroi.*	*Thurrawal.*
Sun	*yerrai*	*wure.*
Eclipse of sun	*yerrai-wurundai.*	
Moon	*gille*	*dyedyung.*
Stars, collectively	*mirre*	*jingjingurra.*
Orion's belt	*giwirnga*	*burrara.*
Pleiades	*berrian-ngumma*	*mullamullung.*
Milky-way	*thuba.*	
Morning Star	*muuun*	*mullyan.*
Sunshine	*yerrai-dhuri*	*wuriwure.*
Shooting star	*mirriguuun*	*jirrawullung.*
Rainbow	*yuluwirri.*	
Clouds	*yuru*	*kurru.*
Sky	*gunagulla*	*minjigarri.*
Thunder	*dhalume*	*murunal.*
Lightning	*mi*	*nharrawangai.*

English.	*Kamilaroi.*	*Thurrawal.*
Rain	*kulli*	*bunna.*
Dew	*kugil*	*jibbir.*
Mist	*wunun*	*berrung.*
Fog	*goa*	*murdyang.*
Snow		*gunama.*
Frost	*dhundar*	*dhuggalang.*
Hail	*thurrian*	*gura.*
Water	*kulli*	*ngadyung.*
Ground	*dhoan*	*dhulga.*
Mud	*milli-milli*	*burra-burrak.*
Stones	*yarral*	*gurabung.*
Rocks	*yarralboalli*	*wullangurra.*
Sand	*kurraian*	*murrang.*
Light (of a fire, &c.)	*dhuri*	*wuriwure.*
Darkness	*ngurubillal*	*munnung.*
Dawn and dusk	*gurawawan*	*jirranggan.*
Heat	*bulert*	*irraman.*

English.	*Kamilaroi.*	*Thurrawal.*
Cold	*kurril*	*maiin.*
Camp	*wullai*	*ngura* or *munnga.*
Fire	*wi*	*kanbi.*
Ashes	*girrau*	*dubbil.*
Charcoal	*kaiir*	*murrungga.*
Spark	*diddelan*	*jinjimbur.*
Smoke	*thu*	*kúnda.*
Hut	*dura*	*ngura.*
Meat food	*dhih*	*murni.*
Vegetable food	*kobaiai*	*dhungang.*
Night	*bungara*	*burai.*
Morning	*nguragullago*	*burriwurri.*
Evening	*bulului*	*burabura.*
Sun-rise	*yerraidhuri*	*wuriwaulai.*
Sun-set	*yerraiyarrin*	*wuri-iribolai.*
Moonrise	*gilledhuri*	*dyedyungbaulai.*
Moonset	*gilleyarrin*	*dyedyung-iribolai.*
Sand-hill	*kurraidhuyal*	*murrang.*
Big hill or range	*kubba*	*bullawarri.*
Single hill	*kubbadhul*	*bobbarung.*
Little stream, creek	*dhurra*	*dhurragangang.*
Large stream, river	*buggai*	*dhurragang.*
Grass, collectively	*yerramulla*	*bumbur.*
Trees, collectively	*yulil*	*gunduwuloala.*
Bark of trees	*ngunda*	*dhunga.*
Bark shed by trees	*dhurrah*	*nyirnyirrang.*
Wood for fire	*wugan*	*kanbi.*
Hole in a tree	*birru*	*kumir.*

English.	*Kamilaroi.*	*Thurrawal.*
Hole cut in a tree	*bailuma*	*dhurramanga.*
Leaves of trees	*bu*	*jirang.*
Bird's nest	*dhiggeragu-wullai*	*nguranung.*
Bird's eggs	*ko*	*kubban.*
Honey	*wuddul*	*nguga.*
Edible grub (wattle tree).	*yuluga*	*burrang.*
Edible grub (gum tree).	*yerrungun*	*kubbañ.*
Edible grub (coolaba tree).	*bira.*	
Edible grub (in grass tree).		*bungomir.*
Pathway	*warrui*	*yawung.*
Shadow of tree	*wadhur*	*muddhang.*
Shadow of man	*guramun*	*muddhang.*
Tail of animal	*dhun*	*murraunng.*
Echo	*wawal* or *bungul*	*wungar.*
Fur of animals	*dhurun*	*jirrar.*
Feathers of birds	*wirril.*	
Down of birds	*nuddhar.*	*burun-buren.*
Spines of hedgehog	*gwirrel*	*dhuradhural.*
Scales of fish	*ginbul*	*nyir.*
Claws of animals	*yulu*	*birraunng.*
Splinter	*bilginder*	*buggal.*

MAMMALS.

English.	*Kamilaroi.*	*Thurrawal.*
Native bear	*guda*	*kurrilwa.*
Dog	*buruma*	*mirragang.*
Puppy	*gwurral.*	
Opossum	*mute*	*guranara.*
A young opossum	*buggaga.*	
Kangaroo rat	*dhuarrawai*	*kunnimang.*
Native cat (yellow and white).		*wagara.*
Native cat (black and white).	*muka*	*wungar.*
Wallaby	*wangwi*	*burrah.*

English.	*Kamilaroi.*	*Thurrawal.*
Flying fox		*kaundhunna.*
Bandicoot	*kuru*	*burdula.*
Flying squirrel	*buggu*	*bunggu.*
Ring-tail opossum	*kurrawir*	*dhurrambang.*
Kangaroo	*bundar*	*buru.*
Wallaroo	*yulama*	*warrung.*
Padamelon	*mindere*	*buloa.*
Porcupine	*wirrēla*	*gunungguir.*
Wombat		*gulung.*
Platypus		*jumnalung.*
Water rat		*biawur.*

BIRDS.

English.	*Kamilaroi.*	*Thurrawal.*
Birds, collectively		*bujan.*
Crow	*waru*	*wawarnang.*
Laughing jackass	*kurrawurra*	*kugara.*
Curlew	*wurean*	*munningang.*
Plain turkey	*burrawa.*	
Quail	*kiddhule*	*burawul.*
Brush turkey	*wirrila*	*jirra.*
Eagle-hawk	*thirril*	*mulyan*
Emu	*dinoun*	*murriang* or *birribañ.*
A young emu	*bŭrgai.*	
Common magpie	*kulu*	*karugang.*
Black magpie	*wiu*	*yungang.*
Peewee	*burrindin*	*wallaiarin.*
Black duck	*kurrangai*	*guna.*
Mopoke	*bulur*	*gogók.*
Ground-owl	*bukatakutu*	*junajannit.*
Pigeon (bronze-wing).	*dhummar*	*gurgang.*
Ground-parrot	*burangga.*	
Ibis	*yuagair.*	

English.	*Kamilaroi.*	*Thurrawal.*
Shag	*wurungaiawa*	*minyunggura.*
Pelican	*gulaiale*	*kurranggaba.*
Native companion	*buralga*	*guradhawak.*
Galah	*gila*	None in the district.
Bower bird	*witha.*	*bumbiang.*
Dove	*gubudhu*	*mulmulgang.*
Black swan	*pariawul*	*gunyung.*
Musk-duck	*birrala.*	
Crane (slate coloured).	*kurraga*	*galu.*
Brown-hawk (large)	*wundhulla*	*bibburdugang.*
Wood duck	*bunumbai*	*ngullangang.*
Fish-hawk	*gwaia-murrawai*	*murridha.*
Red-bill	*buyugun*	*ngurribar.*
Water-hen	*dhillull*	*bungurl.*
Parrokeet	*binga*	*wullungurril.*
White cockatoo	*murai*	*yumbaiumba.*
King fisher	*thadhir*	*jugurawa.*
Plover	*baldhurra-dhurra*	*bindyerrang-dyerrang.*

FISHES.

English.	*Kamilaroi.*	*Thurrawal.*	English.	*Kamilaroi.*	*Thurrawal.*
Fish, collectively	*kwia*	*dhũñ.*	Mussel, small	*ginbai.*	
Perch	*burra*	*buandea.*	Frog	*dhurran*	*jerrungulli.*
Bream	*kumbal*	*irramurri.*	Eel		*burra.*
Cod	*gudu.*		Whale		*burri-burri.*
Mussel, large	*dhunggal*	*binderagurang.*	Shark		*yungga.*

REPTILES.

English.	*Kamilaroi.*	*Thurrawal.*	English.	*Kamilaroi.*	*Thurrawal.*
Tree iguana	*yurundiali*	*jindaula.*	Carpet snake	*yabba*	*mugga.*
Ground iguana	*dhuli*	*wurrur.*	Brown snake	*nurai*	*birragundhang.*
Water lizard		*waruga.*	Black snake	*guli*	*mundha.*
Jew lizard	*dhari.*		Centipede	*giun*	*jillingurri.*
Sleepy lizard	*dhullagul*	*muggadhung.*	Common grey lizard	*gumumma*	*bunburrang.*
Shingleback	*munggai*	None in the district.	Scorpion	*dhula.*	
Death adder	*mundhur* or *mumbal*	*muddyauity.*	Turtle	*warraba*	*kutumang.*

INSECTS.

English.	*Kamilaroi.*	*Thurrawal.*	English.	*Kamilaroi.*	*Thurrawal.*
Locust, large	*ngurrela*	*gullang-gullang.*	Mosquito	*mungin*	*duda.*
Locust, small		*jirrabirrin.*	Grasshopper	*búnbún*	*dyilwir.*
Blow-fly	*nuyubul*	*mirrang.*	Caterpillar	*karrarngan.*	
Common fly	*bululu*	*mirrang.*	Bee	*guni*	*gurrinhung.*
Louse	*munye*	*gunggal.*	Queen bee	*gunini*	*ngubbanhungulal.*
Nits of louse	*kurrai*	*kurrian.*	Hornet	*gua*	*mur-r.*
Bull-dog ant (red)	*kubbian*	*gurrawur.*	Spider	*kurra*	*murrara.*
Bull-dog ant (black)	*buballa*	*gurrawur.*	Common ant	*kanal*	*biddhura.*
Jumper ant	*milbauari*	*mundi.*			
Greenheaded ant	*mu-un*				

ADJECTIVES.

English.	*Kamilaroi.*	*Thurrawal.*	English.	*Kamilaroi.*	*Thurrawal.*
Alive	*murunbu*	*murungale.*	Noisy	*budla-kurrai*	*mural.*
Dead	*bullu*	*bullia.*	Silent	*kurriyalliba*	*jangaiiri.*
Large	*bural*	*gaian.*	Ripe	*ili*	*gunnaia.*
Small	*kainmurra*	*murradha.*	Unripe	*yerri*	*gudya.*
Long	*guraralla*	*yarrambal.*	Blunt, as a point, etc.	*mur*	*mugu.*
Short	*buriaga*	*gulugang.*			
Good	*murraba*	*nuggũng.*	Sharp	*yuddhala*	*dyurugun.*
Bad	*kuggill*	*gurnung.*	Fat	*wommo*	*guréan.*
Hungry	*yulugin*	*kuggaiiri.*	Lean	*burrubbera*	*buggũng.*
Thirsty	*kullengin*	*jimbai.*	Hot	*buler*	*yirraman.*
Red	*gwai-gwai*	*ngurung-ngurung.*	Cold	*kurril*	*maii.*
White	*bullá*	*jillawaraura.*	Clear	*gillu*	*bangal.*
Black	*buluwi*	*ngunda.*	Dirty	*nula*	*murungadha.*
Green, as a tree	*koror*	*gudya.*	Angry	*hileyan*	*dyurang.*
Lame	*dhunggu.*		Sleepy	*ngurarugu*	*gungung.*
Quick	*kullier*	*idhan* or *jerwurt.*	Glad	*giaginye*	*ngwiai.*
Slow	*kuraiba*	*janboara.*	Sorry		*ngurrumbai.*
Blind	*muga*	*mullaraura.*	Generous	*wuddhaiala*	*bindilang.*
Deaf	*murbinna*	*muruñ.*	Greedy	*kũmil wud-dhaiala*	*mudyur.*
Strong	*buddhur*	*gumbul.*			
Weak		*mulaty.*	Grey-headed	*kuddhiya*	*yerrawallung.*
Light (not heavy)	*kubbunba*	*birra-birra.*	Sick	*wibilda*	*birrity.*
Valiant	*buddhayul*	*biyawallung.*	Stinking	*nue*	*burung.*
Afraid	*geliel*	*jardu.*	Well in health	*murruba*	*nuggung.*
Sweet	*kubba*	*dyilbalang.*	Wide	*mungamunga*	*bilulli.*
Bitter	*buddhah*	*muya-muya.*	Narrow	*waddhu*	*innimul.*
Right	*kir-murru*	*nuggung.*	Bald-headed	*birrargóga*	*jimbaierrung.*
Wrong	*kumil-murru*	*gurnaianung.*	Many or plentiful	*budlaba*	*burrumurrung.*
Straight	*wurrugil*	*waru-waru.*	Few	*gunabila*	*kulliatba.*
Crooked	*wurra-wurra*	*gulan-gulan.*	Half	*bunger-kummila*	*birrimbanyung.*
Tired	*inggil*	*barru.*			

English.	*Kamilaroi.*	*Thurrawal.*	English.	*Kamilaroi.*	*Thurrawal.*
Jealous	*milbaradal*	*yurung.*	Hard	*buddhur*	*dudduwar.*
Near	*gunba*	*bulla.*	Soft	*bunan*	*mulaty.*
Far	*birru*	*wurri.*	Dry	*bullal*	*dyidyir.*
Deep	*kuru*	*guddha.*	Wet	*kugil*	*nadyunadyung.*
Shallow	*kunnai*	*bullarang.*	Easy	*guremulla*	*gurrumbunga*
Pregnant	*mubalyal*	*bindiwindang.*			

VERBS

Live	*murun*	*murung.*	Cry, as a child	*yugilla*	*dunggai.*
Die	*bullage*	*bulling.*	Cut	*kurrala*	*kullia.*
Eat	*dhale*	*dhainmung.*	Frighten	*gielyelmi*	*jawingara.*
Drink	*ngarrugi*	*ngundumurri.*	Fly, as a bird	*burragi*	*yerwai.*
Sleep	*babi*	*nŭnggŭng.*	Hang up	*bindabilla*	*bettaba.*
Stand	*wurrai*	*dhurring.*	Hold	*gunmulla*	*gurrungu.*
Sit	*ngurri*	*ngullung.*	Jump	*barri*	*yaddera.*
Lie down	*babilla*	*yerrambing.*	Jump over anything		*jilmurra.*
Hide	*babia*	*buddhari.*	Keep	*ngainubba*	*yuindea.*
Come	*thaiyannunga*	*yeungulang.*	Laugh	*gindume*	*jundung.*
Go	*yannunga*	*yendea narrea.*	Scratch	*manange*	*garwa.*
Talk	*kurrai*	*gamung.*	Leave off	*kurria*	*wunnundea.*
Shout	*kuggulla*	*kurrugaia.*	Lose	*dhullawaginni*	*dhubbungurra.*
Tell	*gwalla*	*gara.*	Pinch	*nyimulla*	*nyilmai.*
Walk	*yannawan*	*yenda.*	Praise	*murrummurrumulda*	*nuggungbaiamurra.*
Crawl	*dhura*	*yendung.*	Rejoice	*murruginni*	*yellagang.*
Run	*bunnagaia*	*jauara.*	Remember	*winnungullea*	*buindyerra.*
Bring	*dhaiganga*	*ngaingulang.*	Forget	*murginnhe*	*mundura.*
Take	*dhumalia*	*mandia.*	Turn off (a road)	*burunga*	*wullaitgang.*
Carry	*kanumea*	*ngaiamung.*	Stare	*bumbangummilli*	*nandea.*
Make	*gimobilli*	*wutgurra.*	Send	*buiaweali*	*irrurra.*
Sow	*baianningulda*	*irrabamung.*	Shake	*dhirramballa*	*imurra.*
Chip or chop	*dhuralla*	*jindamung.*	Shine	*gwialda*	*bullajarrung.*
Break	*kummulli*	*gulatbungara.*	Spread	*dhiagurrilla*	*dhaumbara.*
Beat	*bumulli*	*bulmillang.*	Suck (as a child)	*ngummûnga*	*idhummai.*
Fight	*bumullea*	*bulma.*	Suck a wound		*binburra.*
Kill	*ballubuddhuna*	*gulanya.*	Swim	*kubia*	*wullunya.*
Get up	*wurraia*	*baitgang.*	Taste	*dhuddulli*	*gundurra.*
Fall down	*bundanga*	*burwura.*	Touch	*kurridhulla*	*buttea.*
See	*ngummilla*	*nandia.*	Twist	*wirrabilda*	*guinmurra.*
Hear	*winungulli*	*ngurrunde.*	Rub	*karulla*	*ngarwurri.*
Grow	*yuruwan*	*gaianwilai.*	Search	*thamaiamulla*	*waiagurra.*
Give	*wuri*	*binding.*	Spit	*thubilla*	*jibbamung.*
Love or like	*gingille*	*ngûmbumea.*	Smell	*buia*	*jina.*
Sing	*buina*	*yangamung.*	Throw, with force	*kauila* or *kurruwila*	*yerria.*
Weep	*yunga*	*dunggung.*	Pitch or throw	*wala*	*yundura.*
Play or dance	*yulunga*	*wurrairi.*	Help	*bûnmulle*	*ngaiindillindadingal.*
Cook, as food	*winuya*	*kanama.*	Sweat	*ngurui*	*ngulur.*
Cough	*gunugunu*	*kutthabari.*	Whistle	*wilea*	*winburra.*
Sneeze	*gigwi*	*jirnganggali.*	Avenge	*kurrimea*	*jilliburri.*
Steal	*karamulle*	*karangara.*	Pretend	*yeldungila*	*nhŭrmurra.*
Burn	*gudhe*	*kunnamurri*	Kiss	*ngaigaialla*	*mimburra.*
Ask or beg	*dhaialla*	*jajamung.*	Vomit	*kawila*	*beggarung.*
Barter	*wurialea*	*warwala.*	Dance	*yulunga*	*kulling.*
Bite	*hila*	*bubbugai.*	Dive	*warungaia*	*ngŭlwarra.*
Blow, as with mouth	*bubilla*	*bimbara.*	Sting or stab	*dhuni*	*thurara.*
Catch	*kunmulla*	*mumbunya.*			
Climb	*gullé*	*bo-in-ya.*			
Cover	*gûndawulla*	*bidburra.*			

Vocabulary of Darkiñung Words.

The following vocabulary contains about 330 of the most important Darkiñung words in general use, with their equivalents in English. Every word in the vocabulary has been written down by myself in the camps of the aborigines, and much time and care have been bestowed upon the work:—

English.	*Darkiñung.*
A man	*kuri.*
A father	*biambai.*
An old man	*ngarrombai.*
A husband	*mullamang.*
A clever man	*gurráchi.*
Young man	*wungar.*
Small boy	*wurrea.*
Brother	*binghai.*
Mother's brother	*gauan.*
A woman	*ũnkung.*
An old woman	*ngarrungan.*
Mother	*dhunggan.*
Mother's sister	*ngarkañ.*
Wife	*ginmang.*
Small girl	*mirkan.*
Sister	*ngarrin.*
Child of either sex.	*gujagang.*
A ghost	*buddhung.*

Parts of the Human Body.

Head	*kamburung* or *koko.*
Forehead	*ngurran.*
Hair of head	*kyuar.*
Beard	*yarring.*
Eye	*mikkang.*
Eyebrow	*miltheri.*
Nose	*nukur.*
Lower jaw	*ngandung.*
Lips	*wiling.*
Mouth	*gurka.*
Ear	*binungari.*
Tongue	*dhallung.*
Teeth	*dharra.*
Breast, female	*ngubbang.*
Stomach	*bindhi.*
Back	*bulka.*
Pregnant	*bindhigang.*
Woman's milk	*ngubbang.*
Shoulder	*gũndang.*
Arm	*dharrung.*
Elbow	*nguna.*
Hand	*burril.*
Leg	*ngarri.*
Knee	*bũngur.*
Shin	*jarra.*
Thigh	*dhurra.*
Foot	*dhunna.*
Paunch	*gunung.*
Small guts	*birrañ.*
Fat	*wommo.*
Bone	*jarra.*
Blood	*mulan.*
Penis	*buthan.*

English.	*Darkiñung.*
Erection	*ngarrukutthi.*
Testicles	*bûrral.*
Vulva	*muku.*
Copulation	*nguttathi.*
Masturbation	*ganmillutthi.*
Venereal	*milyang.*
Urine	*gilatthi.*
Anus	*bûng.*
Excrement	*goona.*

Inanimate Objects.

Sun	*bunnal.*
Moon	*gũndong.*
Stars, collectively	*guwanga.*
Pleiades	*murkanda.*
Orion's belt	*gũnggun.*
Rainbow	*garnang.*
Thunder	*wũnggal.*
Clouds, or sky	*gura.*
Strong wind	*gurugama.*
Lightning	*mummakutti.*
Rain	*murku.*
Dew	*gillibin.*
Fog	*gurpang.*
Frost	*binnar.*
Hail	*wallaji.*
Water	*batu.*
Ground	*burrê.*
Hollow ground[1]	*burratu.*
Stones	*dyuruk.*
Steep rock	*yirringbin.*
Cave	*burrung.*
Hill	*burpo.*
Sand	*marrang.*
Mud	*munyung.*
Light	*gilli.*
Darkness	*minnik.*
Heat	*winyu.*
Camp	*ngurra.*
Fire	*kwiang.*
Hut	*gũnji.*
Smoke	*kudyal.*
Food	*ngunnuñ.*
Day	*burriang.*
Night	*minnik.*
Morning	*burpiyal.*
Evening	*warrákal.*
A splinter	*dhuraga.*
Creek or valley	*bummé.*
Bark shed by trees.	*mukkur.*
Fire wood	*kukkirang.*
Hole in a tree	*kumir.*
Leaves of trees	*girrang.*
Eggs	*kunggurrai.*

English.	*Darkiñung.*
Honey	*kûdgung.*
Edible grubs	*burragung.*
Red paint	*wirruk.*
White paint	*burrak.*
Pathway	*muru.*
Shadow of a tree	*bûllu.*
Shadow of a man	*gurumin.*

Mammals.

Opossum	*girribil.*
Porcupine	*kunyi.*
Dog	*mirri.*
Native bear	*kuluwañ.*
Kangaroo-rat	*dharrumbai*
Native cat	*mitthingin.*
Rock-wallaby	*wirrañ.*
Scrub-wallaby	*murri.*
Flying-fox	*wannagan.*
Bandicoot, long nose.	*binbuñ.*
Bandicoot, short nose.	*burka.*
Flying squirrel	*bunggo.*
Ringtail opossum	*gindang.*
Kangaroo	*wallumbang.*

Birds.

Birds, collectively	*dyippung.*
Crow	*wallugan.*
Hornbill	*gurrigang.*
Laughing jackass	*kukundi.*
Curlew	*warébun.*
Peewee	*dyulinggir.*
Eaglehawk	*mullian.*
Pheasant	*gindul.*
Common magpie	*kurápul.*
Wood duck	*ngúwalang.*
Black duck	*gurungai.*
Mopoke	*kwanggung.*
Black magpie	*wandu.*
Wonga wonga	*wonga wonga.*
Rosella parrot	*murúnda.*
Common hawk	*bibbitya.*
Black swan	*mulgwa.*
Kingfisher	*dyuramba*
Crane	*dhurali.*
Emu	*gungurung.*
White cockatoo	*nganal.*
Plover	*girragirra.*
Fish hawk	*irrumburri.*
Leather-head	*kalgura.*
Thrush	*dhutugai.*

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[1] In some localities the ground is hollow underneath the surface, and gives a low rumbling sound when stamped upon, as in dancing or running.

FISHES.

English.	*Darkiñung.*
Perch	*wukkur.*
Eel	*burra.*
Turtle	*kulumung.*
Mussel	*biddyágan.*
Frog	*gutal.*

REPTILES.

English.	*Darkiñung.*
Iguana	*bûnjerra.*
Water iguana	*bidjiwong.*
Jew-lizard	*wirrummin.*
Sleepy-lizard	*ngulong.*
Black snake	*mulu.*
Carpet snake	*buttér.*
Brown snake	*birrijirral.*
Death adder,	*múnda.*
Centipede	*búrranburran.*
Scorpion	*dhuraniñ.*

INSECTS.

English.	*Darkiñung.*
Large locust	*gurang-gurang.*
Blow-fly	*mulung galung.*
Louse	*bûndyu.*
Nits of lice	*dyakkir.*
Bull-dog ant	*guiaking.*
Mosquito	*dyuping.*
Common fly	*maiunga.*
Grasshopper	*jilpir.*
Wasp	*murulgang.*
Bee	*nyittik.*
Spider	*gullimbalga.*
Butterfly	*burrudir.*

TREES AND PLANTS.

English.	*Darkiñung.*
Any leaning tree	*wallung.*
Any dead tree	*dhalga.*
Any hollow tree	*burutu.*
Ironbark	*dyikkir.*
Stringybark	*burun.*
Gum-tree	*yerra.*
Apple-tree	*dhallawang.*
Grass-tree	*wirrákal.*
Wattle	*budjigai.*
Ti-tree	*butyoa.*
Myrtle	*dulagur.*
Reeds	*gwambung.*
Yam	*waiung.*
Joebung	*mambar.*
Ferns	*gutung.*
Oak	*billar.*
Trees, collectively	*ngarrukalitti.*
Grass, collectively	*wuyu.*

WEAPONS, UTENSILS, ETC.

English.	*Darkiñung.*
Tomahawk	*mugu.*
Koolamin	*kúnggun.*
Yamstick	*kunni.*
Spear (wood)	*dyulu.*
Spear (reed)	*kummai.*
Fish spear	*dhuddai.*
Spear-thrower	*wommur.*
Club, with knob	*kuburra.*
Club, plain	*gutyer.*
Boomerang	*barkan.*
Spear-shield	*guril.*
Waddy-shield	*millultung.*
Canoe	*náwai.*
Net-bag	*gulai.*

ADJECTIVES.

English.	*Darkiñung.*
Alive	*mutung.*
Dead	*dulung.*
Large	*dunggang.*
Small	*warrea.*
Long	*gurar.*
Short	*dyammulan.*
Good	*yutta.*
Bad	*gutya.*
Hungry	*dhulli.*
Thirsty	*durral.*
Full stomach	*gundu.*
Quick	*ngát.*
Slow	*warral.*
Blind	*múñmiñ.*
Deaf	*núkmang.*
Strong	*gŭlgŭl.*
Heavy	*dullal.*
Afraid	*gindya.*
Sweet	*wikkil.*
Silent	*muka.*
Blunt	*mupa.*
Lean	*jurra.*
Angry	*gulai.*
Sleepy	*nungur.*
Glad	*walthé.*
Sorry	*ngaraty.*
Greedy	*buluñ.*
Sick	*budjel.*
Well	*yuttabutte.*
Grey-headed	*warrunggati.*
Some	*dhanguñ.*
None	*bundi.*
Tired	*wunal.*
Stinking	*buraty* or *guja.*
Narrow	*warrea.*
Wide	*billañ.*
Many	*guri-guri.*
Few	*wakul-wakul.*
Half	*wakullungi.*
Jealous	*mindalbutti.*
Far	*warri.*
Near	*mákan.*
Deep	*birko.*
Hard	*narrama.*
Soft	*yambuñ.*
Straight	*dhurur.*
Crooked	*wallegulan.*
Sharp (edge)	*gimbai.*
Cold	*guttir.*
Hot	*gunnutti.*
Lazy	*gutyaling.*
Male	*kanal.*
Female	*ngappul.*
Stupid or deaf	*núkmang.*
Crazy	*ngurrawai.*
Dirty	*munyungger.*

VERBS.

English.	*Darkiñung.*
Cry (as a child)	*dhúngga.*
Frighten	*ginjabunga.*
Hang up	*burpangga.*
Jump	*karukali.*
Laugh	*yaringati.*
Scratch	*kargillitti.*
Leave off	*guranba.*
Pinch	*nyimmutti.*
Lose or forget	*nguttiwa.*
Rejoice	*bithal.*
Go on	*gannauerra.*
Come back	*wallumbabaiñ.*
Turn off	*ngannuka.*
See	*dündilli.*
Stare	*murummailli.*
Send	*yandang.*
Shine	*mullikutti.*
Give	*yangga.*
Swim	*watbutti.*
Search	*galuma.*
Spit	*jukutti.*
Smell	*kundatti.*
Hit with missile	*dŭtbutti.*
Whistle	*wárgutti.*
Kiss	*dyúnggatti.*
Vomit	*mulatti.*
Dance	*nungara.*
Dive	*kumbuluk.*
Sting	*dharrati.*
Coming down	*girrápi.*
Die	*balluti.*
Eat	*bonditti.*
Drink	*ngurutti*
Stand	*ngaruki.*
Sit	*ngullawatti.*
Lie down	*nunggain.*
Walk	*yanna.*
Run	*murundalari.*
Bring	*managaluring.*
Take	*manawarri.*
Carry	*wandatta.*
Make	*burra.*
Break	*gutpunga.*
Strike	*buăbunyi.*
Get up	*buritga.*
Fall down	*balati.*
Hear	*ngarratti.*
Sing	*gutitti.*
Weep	*dhunggati.*
Cook (food)	*kunnuma.*
Steal	*karámal.*
Pretend	*wandyákur.*
Bite	*batyitti.*
Blow (with the mouth).	*búmbutthi.*
Hide	*kurratti* or *dŭtbutti*
Talk	*ngongga.*
Tell	*waiamutti.*
Climb	*gulliwai.*
Suck (as a child)	*nguppang wurramutti.*
Suck (as a wound)	*búndutti.*
Rebuke	*guliñmutti.*
Watch	*dhurramutti.*
Hunt or seek	*gatillimutti.*
Put down	*yoána.*
Perspire	*ngurrindyulgutti*
Touch	*mánabundi.*
Hold	*ólbunga.*
Twist	*warbungali.*

APPENDIX.

Some Native Tribes of Victoria.

All the languages of the native tribes of Eastern Victoria, although quite different in vocabulary, are the same in grammatical constitution as the Thurrawal tongue, described by me in an article to the Royal Society of New South Wales.[1] The nouns, pronouns, verbs, adverbs, prepositions, etc., can be inflected for number and person, as illustrated in the article referred to. There is a singular, dual and plural number, with a double form of the first person of the two latter—one including and the other excluding the party spoken to.

All the above remarks equally apply to the languages of that portion of Victoria situated west of the 145th meridian of longitude, with the addition of a trial number in all the parts of speech subject to inflection. The trial number, as existing in the native languages of Victoria, is different in character to that observed in some other countries. For example, in the New Hebrides the case endings of the dual, trial and plural are independent, and differ from each other in form, as follows: We (dual inclusive), *akaijau.* We (trial inclusive), *akataij.* We (plural inclusive), *akaiju.*[2]

But among the Victorian tribes, the trial number is formed by adding another case-ending to that of the plural. For example, in the Tyattyalla, Tyeddyawurru and Wuddyâwurru languages, an additional ending, Kullik, is tacked on to the termination of the suffix of the plural; thus:—We (plural inclusive), *yurwengurrak.* We (trial inclusive), *yurwengurrakkullik,* and so on. In the Thaguwurru and kindred tongues the word *baiap* is substituted for *kullik,* but it is employed in precisely the same manner—it is added to the suffix of the plural.

Indications of a trial number were noticed by the late Mr. Francis Tuckfield[3] in the pronouns of the Woddowro (Wuddyāwurra) tribe, but its general application to other parts of speech has not hitherto been reported.

In order to illustrate the Victorian trial, I will briefly introduce the conjugation of the present tense of the verb *ngurna,* "to sit," through all its numbers:—

Singular	1st Person	I sit	*Ngurnabuinhan.*
	2nd "	Thou sittest	*Ngurnabuinhar.*
	3rd "	He sits	*Ngurnabuinh.*
Dual	1st Person	We, incl., sit	*Ngurnabuingul.*
		We, excl., sit	*Ngurnabuingun.*
	2nd "	You sit	*Ngurnabuinbul.*
	3rd "	They sit	*Ngurnabuinbullain.*

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[1] "The Thurrawal, Gundungurra and Dharruk Languages," *Journ. Roy. Soc. N.S. Wales,* vol. xxxv, pp. 127-160.

[2] *Rep. Austr. Assoc. Adv. Sci.,* vol. iv, p. 714.

[3] *Ibid.,* vol. vii, p. 842.

Trial	1st Person	We, incl., sit	*Ngurnabuingunyinbaiap.*
		We, excl., sit	*Ngurnabuingunninyubaiap.*
	2nd „	You sit	*Ngurnabuinhatbaiap.*
	3rd „	They sit	*Ngurnabuinhurbaiap.*
Pural	1st Person	We, incl., sit	*Ngurnabuingunyin.*
		We, excl., sit	*Ngurnabuingunninyu.*
	2nd „	You sit	*Ngurnabuinhat.*
	3rd „	They sit	*Ngurnabuinhur.*

It may be stated that the Tyattyalla numerals are:—One, *kaiup*; two, *bulety*. The numerals of the Thaguwurru language are:—One, *kôpthun*; two, *bulabil*.

For further information see my article on "The Aboriginal Languages of Victoria," published in the *Journal of the Royal Society of New South Wales*, vol. xxxvi, pp. 71–106.

SOME NATIVE TRIBES OF SOUTH AUSTRALIA.

On the southern coast of South Australia there are a number of tribes, of which the Bûngandity is typical, whose speech is substantially the same in grammatical structure as the Thurrawal, already referred to. In all the languages of South Australia, from the Australian Bight to Port Darwin, I have ascertained that there are two forms of the first person in the dual and plural, one of which includes the person addressed and the other excludes him, a feature which has not hitherto been reported in any of the native tongues of that State. These forms are exemplified in the Bûngandity verb:—

Dual	We, inclusive, speak	*Lahrngul.*
	We, exclusive, speak	*Lahrngulla.*
Plural	We, inclusive, speak	*Lahrnē.*
	We, exclusive, speak	*Lahrnunne.*

Similar forms occur in the pronouns and other parts of speech subject to inflection, but as I am preparing a grammar and vocabulary of the Bûngandity language, no more will be said upon the subject at present.

SOME NATIVE TRIBES OF QUEENSLAND.

In all the languages of Queensland which I have yet personally investigated, the double "we" in the first person of the dual and plural is persistent; a peculiarity which was reported by me for the first time in my grammar of the "Murawarri and other Languages," published in the *Queensland Geographical Journal*, vol. xviii, pp. 52–68.

Most of the native tongues of Queensland closely resemble in general structure the Kamilaroi and Darkiñung languages treated in the present article although differing altogether in vocabulary.

In conclusion I beg to express my best thanks to the Anthropological Institute for affording me the opportunity, before it is too late, to preserve some grammatical records of the speech of the Australian aborigines.

MALAY GAMES.[1]

By D. F. A. Hervey, C.M.G.

Tĕbang-Tĕbuk (cut down and pierce).

This *tĕbang-tĕbuk* is a children's game for two; they both squat on the floor, both putting their hands on the floor. One lifts up his right hand, putting it on his left hand, and the other does the same: they then replace them as before, each placing his left hand upon his adversary's right arm, and his right upon his left, each saying to the other, "*Tĕbang-tĕbuk kwâla-sâlâ, hûjan bungor mâti kâtong sirih râkit pinang jâwa, sentak pĕluk tangan pĕtri.*"[2] When the word "*pĕtri*" or "*princess*" has been uttered, the hands of one must be taken off, and put back on his own neck, then the "*tĕbang-tĕbuk*" has to be repeated again. When the word "*pĕtri*" has been again uttered, the other hand must be brought by each to his own neck, so that the hands are crossed. Then the one who first repeated the "*tĕbang-tĕbuk*" turns to the other, questioning him as follows:—

"*Oh Ĕnche?*" The other replies "Yes," when the questioner asks "What wood is this?" "I am wood of the sea," replies the other, or any other wood he pleases. "Can you cut it?" asks the leader. "Yes," replies the other. "Is there a dog?" "No." "Is there a cat?" "No." "Is there any other animal?" "No." On this the leader gently strikes the hand of the other, which is on his neck, edgeways, saying "*kong*"[3] four times, then the other says "*lol*"[4] four times, or he can *miau*. If he says "dog," the leader drives away the dog, saying, "*Chch, chch, chch,*"[5] etc., and pulls down the hands of the other from his neck, so that the tree has been cut down and has fallen. The leader does this to the other or to each in turn according to the number of players, till the hands of all are taken down. This is the game *tĕbang-tĕbuk*.

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[1] Except where otherwise specified the games here described are played in Malacca. These descriptions of the games are mainly translations of notes furnished to me by Munshi Muhammad Jaafar, my Malay writer in former years at Malacca. Sometimes I have given a very literal rendering instead of adapting it to the English tongue, to give a clearer notion of the Malay form.

[2] The above is merely a jingle, *kwâla*, is mouth of river, with the added jingle *sâlâ* of no meaning; *Hujan*, rain; *bungor*, the name of a waterside tree (*Lagertrœmia*); *mati*, dead; *kâtong*, turtle; *sirih*, betel vine (*piper betel*); *râkit*, a raft; *pinang*, the betel palm (*areca catechu*); *jawa*, Javanese; *sentak*, snatch; *peluk*, embrace; *tangan*, hand; *pĕtri*, princess, merely complimentary.

[3] As though to ask is there a dog.

[4] As if to answer "yes."

[5] Fie!

Tong-tong-bak.

This is a game for two or three children. Each puts one fist on the top of the other—if three play, there will be six fists piled up one on the other; the leader says—

" *Tong-tong-bak*
Rĕmayong ládeh } No meaning. only for sound.
Pĕchah sabîjî,
Pĕchah sarĕngkap."

"Broken one broken the pair."

On pronouncing the word "*sarĕngkap*," the lowest fist is opened out flat, palm downwards, then—

" *Tong-tong-bak,*
Rĕmâyong ládeh,"

is repeated to the end, and when the word "*sarĕngkap*" is pronounced then the second lowest fist is opened out flat on the one previously flattened, and so on until the fists have all six been flattened out. Then the leader repeats the "*tong-tong-bak*" over the flattened hands, raising and lowering them as he repeats it, then he sings, "*Ram ram pisang, pisang másak sabiji, datang buaya kûdong sambar bawa' lari,*"[1] then he cries out and spits on the hands; then the children quickly draw away their hands.

Tĕpok Kĕling.[2]

This is played by two children squatting opposite each other. They first clap hands together; then one closes his fist, and strikes the open palm of the other, then they each strike the palms of their own hands together, then they strike each other's hands palm to palm, right hand to right, and left to left in turn, saying each at the same time—

" *Umpâma aku tĕpok pergi, ia tĕpok mari.*"
As I slap to go (that way), he slaps to come (this way).

Then each slaps the other's shoulder. Then they each slap their own thighs. Then they begin over again, without clapping their own hands, and so go on as they like.

This appears to be our "hot beans."

Jĕntek (shoot or chicknode) *lôbang* (hole).

This can be played by three, four, or five persons. First two dig a hole in the ground. Then they arrange for playing with *gâyar*[3] seeds, or the hard fruit (*bûah*

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[1] The bananas are ripening (when) one banana (is) ripe, comes the maimed crocodile seizes and carries it off.

[2] *Indian origin;* "*Kĕling*" is Malay for Southern India from Madras coast.

[3] *Gayar* or *gayau* is the seed of the *lĕburu* creeper (*entada scandens*), which bears enormous spiral pods.

kras).[1] Each takes ten seeds, they fill the hole with water, some of the seeds are placed in the hole, then one throws some seeds near the hole, and one he chooses and shoots at; if he knocks it into the hole, he gets all the seeds outside and in the hole, if he misses it another shoots, and so it goes on until someone hits the seed named into the hole, when he gets all the seeds that have fallen into the hole and those outside. The seeds when thrown near the hole are separated one from the other with the fingers of the left hand. The seed pointed out must be knocked into the hole, or it does not count.

When one lot of seeds has been disposed of, another lot is put near the hole, and is shot at. If the shooter knocks the chosen seed into the hole, he gets that one, and goes on shooting again until he misses; he gets as many as he knocks into the hole, and when he misses, another takes his place and scatters the seeds near the hole, having removed those placed there by his predecessor. Each man has the chance of playing out all the seeds of the others; each has, say, twenty seeds, but when he goes to shoot he has all those belonging to the others to shoot with. If any one slips his thumb in shooting, that disqualifies him for that turn, and he gives place to another.

Chĕkup pûyuh or âchîkah.

Seize quail (are you) hidden?

Several children play this game. One is teacher. He shuts his eyes, and stands near someone, or near a post. The others run and hide. The teacher says "*âchîkah*"; if the others are not yet hidden they do not answer.

When they are hidden not far, 10 or 20 fathoms off, they answer "*âchîlah*," then the teacher goes with his eyes open in search of one of the hidden ones, anyone he can find, and when a hidden one is in danger of being caught, if he can escape, he runs to the post or person by whom the teacher first stood, and if he can get there and says "*îbu*" (mother), he is all safe, and the others in hiding must all run to the post at the same time; anyone caught by the teacher before reaching the post has to take his place; if he can catch no one, he must remain teacher.[2]

Chĕkup mâta (to seize, hold, eye).

There are two kinds of this game; one is for a child to have his eyes closed by the hands of another, after which someone slaps him on the head, and he has to turn round and identify the striker; if he can, the striker must take his place, if not, he must go on as he is till he can identify the striker. The second kind is for one of a party to be blindfolded, and he has to catch whomsoever he can; the others run about round him touching him, or doing what they like, so long as they do not hurt him, or knock him down, until he can catch one of them, who must take his place.

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[1] *Buah kras*, the candlenut (*Aleurites Moloccanus*) also known as *kĕmiri*, which is, however, the Javanese name.

[2] This corresponds to the German form of "hide and seek."

Tûtop Ĕmping.[1]

This game is played by a grown-up person and a child; the former holds the right hand of the child in his left, then he closes the fist of his right hand and puts his forefinger into the right-hand palm of the child, lifts it up and puts it down again in the palm of the child, as though he were striking something with his fist, at the same time singing "*tûtop tûtop ĕmping, ĕmping dâlam gantang, datang tikus bunting lâri mâsok bâwah bâtang,*"[2] and when he says the last words, he puts his forefinger and thumb on the palm of the child and runs it up his arm to the armpit, on which the child laughs, being tickled on the finger reaching his armpit. He repeats this as often as he likes to amuse the child.

Tûi Bûlan.[3]

This *tûi bûlan* is done by cutting out the shape of the moon (Fig. 1). There are two kinds, one small, the other large, the latter in four divisions. The game can be played by any number. All but one stand inside. If the outsider can touch any of those inside the circle, who run about to incite him, the insider whom he has touched must change places with him.

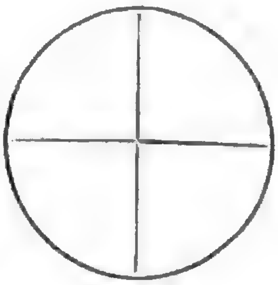

FIG. 1.

This is for a large number, but those in each division can pass to the next division, each tempting the outsider to try and touch one of them.

FIG. 2.

The smaller circle (Fig. 2) is made for a smaller number, but the game is the same; one outside tries to catch one of a certain number within the circle.

Tûi[4] or *Gâlah* (pole).

This is a game for lads and grown-up persons. Ten or twelve, or more, assemble; two are the heads, one for each party. Each party takes the name of a flower, as the *mĕlor,*[5] and the *chĕmpâka.*[6] The rest retire to a distance, and the heads fix the names of the respective flowers they will bear, and then call up the others, who are asked, without knowing which leader they will have to follow, which flower they choose. After the choice is concluded, they separate into two parties. The leaders are called *tâchi or dâchi* (*i.e.*, elder sister; Chinese).

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[1] *Emping* is padi not quite ripe, soaked in cold water, then fried in a pan, after which it is put into a mortar and pounded till it is broken up small, then it is sifted and the husk thrown away and the *ĕmping* used to mix with sugar or coco-nut cream.

[2] Close (or cover up), close the *ĕmping*, the *ĕmping* in the gallon measure, comes the pregnant mouse and runs beneath the stalks.

[3] This game was probably invented after the one next described, being of the same *nature*, but the ground being marked out differently was named after its shape (being round), *bûlan* (the moon).

[4] So called from winner's cry of triumph, "*tûi, tûi.*" This game and the preceding one show between them a resemblance to our English games of "Tom Tiddler's ground," "Oranges and Lemons," and "French and English.'

[5] *Mĕlor*, a kind of jasmine.

[6] *Chĕmpâka* (*Michelia champaca*), a member of the Magnolias.

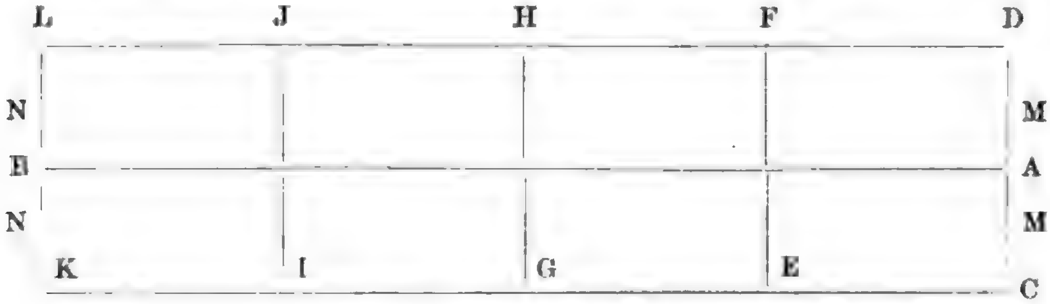

Fig. 3.

Then a place is marked out on the road or on a green (Fig. 3); if there are twelve persons playing, five divisions are made; if ten, four divisions. The attacking and defending parties are fixed on by the *tâwak bûta*[1] test, that is by taking a *gâjus*[2] seed, putting the hands behind the back, bringing them forward again, and asking the other to say in which hand the seed is (this is done between the two leaders); if the guesser guesses the hand in which the seed is, he elects to become the attacking party; if he fails, he has to take the position of the besieged. Six attack, six defend.

The central line is called *gâlah panjang* (the long pole) which is guarded by the *tâchi*. He can defend along that line only from A to B.

If any of the defenders can touch any of the besiegers, the besiegers change places with the besieged; the latter cannot leave the lines marked out—if they touch any besieger when their feet are off the lines, it does not count, but the lines are made a footstep in diameter. The leader along the *gâlah* line can chase people who attack his line, and can touch people from C to D. But he must keep his feet on the line. Such are the rules for everyone in his division.

If one of the attacking party can get into any one of the divisions, and can pass through to M without being touched by the besieged owing to the diversion effected by the attacking party, he then calls out "*tui, tui*," and the rest of his party join him and they march in triumph down to N, then they cannot be disturbed on the way—it is a triumphal procession, which performed, they resume their original position as the attacking party.

Tâwak Bûta.

This game is played by two lads with *gâjus* seeds in the *gâjus* season; each take five seeds. To see who shall begin the game, one takes something small into his hands and shakes it, and retaining it in one hand he crosses his hands, and the other has to choose which hand it is in; if he chooses correctly, the other begins the game. The hand which is empty is said to be full (*isî*), the other to be water (*âyer*). Then the ten seeds are scattered on the floor or on the ground, and the beginner goes on the ground on all-fours, so that the fork of his legs is over the seeds, and he keeps on turning about and pushing the seeds about so as to keep them in the same position as he turns, but his adversary may take them if he can get any of them from under him, but if the one on all-fours can kick the attacking party before he has got a seed clear off, the attacking party has to change places with him. If the attacking party can take away all ten without getting kicked, then he replaces the seeds and the other has to begin again till he can kick the attacking party. In Malacca the game is called *tam-tam gol.*

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[1] This probably means blind bargain, *tâwak* being a corrupt form of *tawar*, to bargain.

[2] "Anacardium occidentale," the cashew-nut, also called *janggus* by the Malays. The fruit is eaten; juice used to make ink. This tree, though originally a West Indian, now abounds in India and the Malay region.

Aliki[1]

This is played by two or three children in the *gâjus* season. Each takes, it may be, two seeds. A circle is described on the ground, and a line or boundary mark is fixed at a certain distance from the circle. Six seeds are placed within the circle and the children retire to the boundary line; each takes a large seed (*gâyar*) called *gondu*, and aims so as to try and drive one of the seeds in the circle out of it; if he hits one and drives it out of the circle he can take it, then his fellows each have a shot, and whoever's *gondu* is nearest to the circle has the first try at a second shot.

Whenever anyone knocks a seed out of the circle, he calls out "*Aliki*," if two seeds at once, he calls out "*Aliki dûa-dûa*," "*aliki tiga*," or "*ĕmpat*," and so on according to the number knocked out, and the shooting is repeated till the six seeds have all been driven out of the circle and won, then they each put in two seeds more and keep up the game till one has lost all his seeds. Supposing they all miss, either stopping short of the circle, or going through or beyond it without touching any of the seeds, then they resume the shooting in order of proximity of the *gondu* to the circle.

Bû-bû-tâ.

This is a children's game. One opens his left hand-palm upwards; the others close their fists and bring their forefingers down on the open palm, saying, "*Bû-bû-tâ.*" The first replies, "*Bâwang pûtih, bâwang mêrah*" (onions white, onions red), *siâpa dâpat chĕkop mâta*" (whoever is caught is blindfolded); as the last word is uttered he tries to catch the forefingers of the others by closing his open palm suddenly, while the others try to withdraw them. Whoever is caught is blindfolded, and the others run and hide, and he has to try and catch one of them; if not, they hide, and when they are hidden he unbinds, and then they all run back to their original starting point (the boy who held out his palm) and on reaching him call out "*ibû*" (mother), *i.e.*, "home." If he can catch one of them before he has reached home, the captured one takes his place and is blindfolded, but if not, he has to be blindfolded again. If he fails three times he is blindfolded again, and led out three times backwards and forwards to the *îbu*, with all the children following, shouting in derision.

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[1] This game recalls "marbles" and "hopscotch."

When a child says "*Bû-bû-tâ*," he puts his forefinger on his lips as he says, "*Bû-bû*," and with the "*tâ*" brings down the forefinger in the palm of the other.

Ĕndul[1] or *Ĕndul pâpan*, or *Buaian*.

cradle plank swing.

This is hung up to a cross-bar with ropes, and a plank is placed with the ends in the loop of the lower ends of the ropes; then some get on to it, several together, or one only; then he sets swinging it with his feet, giving a push off first with one foot.

The *ĕndul* (cradle) is used by Malays to soothe their children with a variety of songs, but the commonest song is as follows: one sings—

"*pûchuk pauh dalîma bâtu,*
anak sembilang ditâpak tangan,
sunggoh jauh nĕgri satu,
hîlang di-mâta, di-hâti jangan,
anak indong."[2]

The nurse says the first line and the children on the swing the second, and the nurse the third and the children the fourth, each at the end of the line repeating "*anak indong*" (mother's child).

Another song for the children on the swing is:—

"*îkan kêkeh* (the kêkeh fish) *ma' nîlai, ma' nîlai* (endearing term)
îkan gĕlâma ma' nîloi, ma nîloi
the gelâma fish, endearing term
adek *sâkit ma' nîlai, ma' nîlai*
sister or brother *i.e.*, the child, sick.
tidak lâma ma' nîloi, ma' nîloi."
not long

The cradle is a cloth hung hammock-wise, and the nurse sings a variety of things, what she pleases; but the regular one is as follows: "*Dûdui*" repeated six times, then "*Dî dûdui,*" repeated six times; then "*Dĕndang-dĕndang, dĕndang di dondong,*"[3] repeated four times.

Main Sĕpak Râga (Kick *râga*). "Kick the wicker."

This is a ball made of rattan openwork plaited about the size of a pummelo[4] it is taken to an open space and kicked about by four or five persons; but it is kicked with the side of the foot, near the ankle, not with the toe, and it must not be allowed to touch the ground, but must be kept in the air; if it does not fall conveniently for the foot to receive it, it can be kept going with the hand, so that it falls in a convenient position to kick. There are no rules or sides in this game, it more nearly resembles football punt-about than anything else.

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[1] Sansk., "hindola," swinging hammock. See Hobson-Jobson, s.v. "Andor."

[2] A shoot of manggo, stone pomegranate (*batu dĕlîma* would be ruby, lit. pomegranate stone), the young *sĕmbîlang* fish in the palm of the hand, truly far, in one country lost to the eye but let it not be to the heart, child of my bosom.

[3] *Dĕndang*, a song to sing. *Dondong*, to carry. *Dondang*, would be to swing.

[4] I have never seen it so large, and should say the usual size is a diameter of 4 to 5 inches (*Citrus decumana*). Perhaps *shaddock* would be a more familiar term to use.

Main gâsing (Humming-top).

This kind is made of bamboo, and a hole is made in the side and a piece of wood is put through the joint with a sharpened end for it to spin on.

Main âwai or Sâlir.[1]

For this game a lime fruit is taken, and a brick is placed in the open and one stands near it, while three or four others wait at a distance about 10 or 15 fathoms off; then the one near the brick tosses the lime up with one hand, and with the other strikes it towards the others, and whoever catches becomes the leader, and the striker joins the rest. If no one catches the lime, the person who failed to catch the lime takes it and rolls it at the brick; if he hits the brick, he goes up to the brick and becomes the leader, if he fails, the person who first stood at the brick has another throw with it, and so on.

Main Kalpu or Kĕlĕpu.

This game is played with *gâjus* (Sing. and Mal. form) or *janggus* (Pinang form) fruit. A hole is dug in the ground the size of a *kĕpul* (or *chûpak*, quart measure), then each player takes five seeds, and the first player takes all the seeds and stands about a fathom from the hole and tosses the seeds into it; if any of them come out of it again, one of the others points out one and tells him to hit it with his *gondu*. He then aims at it and if he hits it, it is called *sîpat*,[2] then he measures the distance between the *sîpat* and the *gondu*; if it exceeds a cubit, then the *sîpat* wins, but if it is within a cubit, then the striker wins all the seeds; and if it is desired to continue the game, a fresh lot of seeds must be produced.

Main wa-u or lâyang-lâyang (Kite-flying).

A small bamboo is split and fashioned into a kite and fastened with strings as in Fig. 4; but it can be made in a variety of shapes. When the bamboo and strings have been fastened together it is called *rangka*, and *wa-u bûdi* (wisdom), *wau sipa-ï* (perhaps Sepoy, *i.e.*, Indian), *wa-u mĕrak* (peacock), etc., etc., according to the pattern, and a sounding instrument is made of *îbus* leaf or *rôtan sĕgâ*,[3] and fastened to the head of the kite.

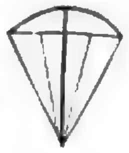

Fig. 4.

A bit of string is fastened to the end of the kite-frame and another to the junction of the upright with the bow, and their ends are joined so that their junction forms the apex of a triangle with the upright for a base; this is called the *tĕrâju* (*i.e.*, balance-weight). To this is secured the long string by which the kite is to be flown.

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[1] I cannot find a meaning for these two words.

[2] *Sîpat*, measure.

[3] *Ibus*, fan-shaped palm, used in making baskets, bags, and mats. *Rôtan sĕgâ*, probably *Calamus ornatus*, the best marketable variety of cane.

Some of the kites have sounding instruments, others not; when they are flying, the sounders hum.

Some kite-flyers fight others, opposing their strings; he whose string breaks first is defeated.

It is a common practice to rub finely broken glass into their strings with sago, to ensure cutting the enemy's string, and so the result depends upon the skill with which the mixture of glass and sago is made and rubbed into the string.

Main pôrok or tempong.

This game is played by four with half coco-nut shells. A boundary line is drawn across the ground. Who shall begin is decided by the players taking their shells in their hands and dashing them together (*tangkup daub*) and whichever shell falls face upwards,[1] the owner gets the start. The owners of those which fall face downwards have to place them face upwards on the ground, and the beginners retire to the other side of the boundary line, whence they drive their shells with the heel (*mĕlérek*) at those placed opposite.

If they hit the first time it counts 100; then the striker returns to the boundary line and this time tosses his shell at the one opposite, and if he hits it, counts 1,000.

He then goes and picks up his shell and drops it on the one he has hit (which is called *ambil lĕmak*, *i.e.*, taking the fat), and if it falls face up into the other shell (*bĕrtindeh*, *i.e.*, pressing close together), he kicks them and runs away; if the enemy catches him before he regains his boundary line, he loses his chance of going on, and the enemy takes his turn at the game from the beginning.

If the striker does not hit the shell opposite the first shot, he goes to wherever his shell has settled and takes another shot with his heel (*langsar*). He can have three shots the first turn; if he misses all three the other tries his chance.

If one player's shell misses the mark and his shell is struck by that of the next player (*tĕrbakar dâpur*, *i.e.*, burnt kitchen or fire-place), the first player picks them up and throws them into the air, to avoid losing his turn; if they fall into each other, the owner of the uppermost kicks them and then makes for the boundary pursued by the other, and if caught loses his turn.

After a player has "langsar'd" both shells in succession, he picks them up and lays them on the ground on their edges back to back (*simbang*) (Fig. 5), and tries to strike them apart with a kick (while the others stand guard over them), without being touched by the guard, and if successful he goes on. The game is terminated at the pleasure of the players. Formerly the penalty exacted by the winner was a hair from the eyebrow of the loser, but this, leading to blows, was abandoned.

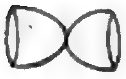

FIG. 5.

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[1] *Tĕrlĕntang.*

Account of the Pôrok Game in Pêrak.

First stage *Pôrok* (to kick in a certain manner).

Second stage *tempong* (to toss).

First stage.—A and B play this game as follows: a small tee similar to that used in golf is made, which is the object at which the halves of coco-nut shell used are aimed. A friend takes A and B's shells, places them together and throws them up in the air. Whoever's piece falls on the concave side plays first. Let A be the winner of the toss. A takes his station about 30·feet distant from the tee and places his shell on the ground behind him. He stands sideways to the tee, and with his right foot behind him, gives a side kick at his shell, sending it towards the tee. When the shell stops he is allowed two more kicks.

Second stage.—Should he succeed in striking the tee, he returns to his starting-point and taking up the shell in his hand, tosses it at the tee. If the shell falls on its concave side, he lifts it, and drops it on the tee, and scores one game. But should the piece, after the toss, fall on the convex side, A is *hâlau* (driven out) *i.e.*, is out of the game, and B commences.

Another account from Favre's Dictionary.

"*Nâli—touché en deux coups: terme d'un jeu, dans lequel un des joueurs, assis à terre* (I never saw this done), *tient entre la plante de ses deux pieds une coque entière de coco, qu'il lance contre une autre placée à une certaine distance; s'il touche celle-ci au premier coup, il obtient 'râtus'* (a hundred), *s'il touche au troisième 'nâli'*; if only the third *mákan láwan*, *i.e.*, devoured by the adversary, and if he touches nothing, he is *lunchas*, missed. This game is called *pôrok*."

Pôrok-pôrok (Pinang).

Two or three stand on a side 6 or 7 fathoms apart; each has a coco-nut shell; one of side A places his shell hollow upwards in the middle; the other, B, pushes his shell behind him (having pressed it between the feet) round the left foot towards the shells in the centre; if it turns over face down on the way he has failed, and has to be ridden three times backwards and forwards between the sides by one of the enemy; but if it remains face up without hitting one of the opposing shells, he can have another shot by taking the shell between his feet, and jumping with it, and thus flinging it against the enemy; if he hit it, he can ride the enemy seven times backwards and forwards; if he fails, he becomes horse to the enemy.

Main Anjan.

Like *kĕlĕpu* or *kalpu*, played with stones or other missiles made of horn or flint, or with money, and a stake is deposited.

Another kind of Anjan.

A *kĕdul*[1] (ball or marble) is taken, pressed between the right forefinger and the left thumb, and it is sent with a spin towards the coins; whichever is knocked down belongs to the player.

---

[1] Favre describes the *kĕdul* under the head of the game *jing* or *ĕjing* as follows: "*Sorte de jeu dans lequel on place en rang des fruits du sintuk (Cinnamomum sintuk) que l'on doit renverser avec une boule nommée kedul.*"

Maïn Gôlik Pâpan (*i.e.*, game roll (on) plank or board).

This game is played with coins; a board is taken about two or three *hastas* (cubits) long and a *jĕngkal* (span between thumb and middle finger) or more broad, and the board is fixed in an inclined position, and a coin is rolled down it from the top to the bottom, and it remains wherever it stops; directly after another shoots a coin after it, and if he strikes, it wins, or if he misses, another shoots, and so on till someone wins or loses.

Main Chĕmpĕlek.[1]

In this game two cents are taken and placed heads together or tails together and then struck on a stone, and when they spring up and fall to the ground, if both turn up heads, the striker is alive, if one heads and the other tails, he is dead, or if both turn up tails, he is alive. The matter is bet about. The striker maintains that he will be alive, the others that he will be dead; when he is alive the striker wins, and if dead, those who bet so win.

Măïn Tauk Lûbang (scooping hole), *or Măïn gôbd.*

This game is played with money or other things, and is played like the game *kalpu.*

Main Chang kâbuĭ.

This is a Chinese game. Take a stick about two *hasta* long, and stick it in the middle of the ground, then take a rattan or stick about three *hasta* long, and also a short stick a *jĕngkal* long. The short stick is taken in the hand and struck with the long stick to a distance, where it falls, and those who are standing there pick it up, and throw it at the upright stick fixed in the ground: if it hits, they win; if not, the striker strikes it again, and so they go on till someone strikes the stick; if no one hits in three turns, then that side become horses and are ridden by the other side, and they, while being ridden, have to take shots at the stick; they remain horses until some one of their side hits the stick.

Main Lambong (tossing) *Kŭda* (horse.)

In this game two sides stand opposite each other, two or three on each side; one on each side becomes a leader, and a piece of cloth or head kerchief is taken and twisted to a length of about a cubit, then it is tossed towards the opposite side, and if anyone can catch it, those on the side of the thrower are called over and turned into horses, only the leader remains standing on his own side; then the cloth is thrown back again towards that leader, who tries to catch it; if he succeeds, all the riders descend from their horses, if not, they are spurred once across the ground and back. Then the leader tosses the cloth back again, and it is received by the rider of the horse, but if he fails to catch it, then he has to dismount.

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[1] Favre has *champlak*, of which, quoting Pijnappel, he says "*un jeu répondant à notre jeu tête ou pilec avec des pièces de monnaie.*" The account in Swettenham and Clifford's *Malay Dictionary*, s.v. *chèmpèlek*, is as follows: "Pitch and toss: a game played with two coins. Note the two coins are placed face to face, back to back, or face to back, and then thrown on the floor. If placed face to face or back to back, it is called *sékah*, and for the one who calls to win, both coins must turn with the same faces upwards. If the coins are thrown face to back, it is called *jual*, and for the one who calls to win, they must turn up one head and one tail."

Mâïn Pĕlâga (fighter) *Kĕlâpa* (coco-nut).

In this game two ripe coco-nuts are peeled, leaving only the shell; two sides stand opposed to each other, and roll the shells into collision; whichever shell breaks, the owner is loser.

Main Pĕlâga Tĕlor (egg).

Each player takes a cooked egg in his hand, and one knocks the egg in the hand of the other; if one breaks, the owner of it is defeated, and the broken egg goes to the winner. The egg to be struck is held in the hand of the owner, only just showing the tip between bases of thumb and forefinger; while the striker holds his between thumb and finger. The narrow ends are struck. Eggs with one end broken are matched, and fought with the broad end.

Main âpit-âpit (pressing or squeezing).

In this game the ground (or a board) is marked like a chess-board, with eight squares, and the pieces are arranged. They can be made of anything, but must be of the same colour for each side. Then one man is put forward to meet the adversary, and it can move left or right, or retire to try and put the adversary in a corner; if one can get the enemy between two of his own, he can take it, and the game is continued till one loses his men.

Mâïn pĕrah[1] or *sâlak* (*zalacca edulis*).

In this game either of the above-named fruits is taken, and two holes pierced through it, big enough to admit a *lîdi*.[2] Then some *râmi*[3] string or twisted thread is passed through the holes, and the two ends of it are fastened in a knot, and the two thumbs are placed in the corners of the thread at each end, and the fruit is spun round so that the string becomes twisted, then it is gently pulled so as to become alternately tight and loose, and the fruit is spun round like a top, and hums.

Mandi Kûda (bathe horse).

A *lîdi* is stuck in the ground at a little distance and a round stone is aimed at it, and if it is hit, the side on the *lîdi* give the other side a ride. There are four a side.

---

[1] An edible nut, produces *a gutta* (*gĕtah*), but not a marketable kind (*Merettia leptopoda*).

[2] Also *lêdi*, a slip from rib of coco-palm leaf.

[3] *Bochmaria nivea.*

Main Sûruk-sûruk (hiding).

This game cannot be played with more than two. Sand or rice (*bĕrás*) or any other similar substance, about two or three *chûpak* (= quart) of it, is heaped up on the ground or a mat, or something of the kind, and is made into the shape of a grave about one *hasta* long; one sits at each end, then one of them takes a stone or seed about the size of the tip of the little finger and hides, or pretends to hide, it in the heap of sand and then puts back the sand right as before. Then he makes two or three marks in the sand, and the other seizes the places he suspects the seed to be placed in; if the seed is found in the place he seizes, he wins, and can claim to strike with second joint knuckles the knee-cap of the other as many times as may have been agreed on till it is bruised, when he can have it smeared with saffron *tĕrus* and *jâdam.*[1]

The Game of Kabdi.

In the game of *kabdi* if there are twenty players, they are divided into two sides of ten each, standing apart at a distance of 5 or 6 *jĕmbas* (1 *jĕmba* = *dĕpá* or fathom).

A line is drawn half-way between them. Then one of a side advances to the other side repeating incessantly "*kabdi, kabdi,*" and tries to pull one of the party across the central line. If he succeeds, the one dragged over the line becomes prisoner, but if he fails he himself becomes prisoner. Whether he fails or wins the other side takes its turn.

The prisoner must be prevented from escaping back to the middle line; should he succeed in doing so the whole of the side which let him go becomes dead and loses one game.

If one side loses till there is only one left, he makes an attack and tries to pull over one of the enemy, but if he succeeds, there is no one to look after his prisoner, and so he must give up.

An agreement may be made beforehand as to how many games shall be played, five, ten or whatever number is agreed on, and if one side wins every game, they may take their opponents and fling them into the bushes. This game is said to be borrowed from the Klings.

Main Pa' Pa' Lang (*i.e.*, father kite).

For this game five or six or any number of children assemble, each standing behind the other and grasping his waist-cloth; the front one is called the *aheli* (head or skilled one). They walk about strung together, the *aheli* saying, "*Pa' Pa' lang bĕrbuntut-buntut ayam pŭtih mĕnggendong tĕlor*—Oh father kite! see the white fowl, with its followers that is full of eggs"—and all those holding on behind reply "*chĭnyap chĭnyap,*" in imitation of chickens several times, walking about meantime. At the same time there is another standing near, and the *aheli* asks him, "Have you any combs for sale?" He replies "Yes," and the *aheli* says, "I want to buy some," and he buys some, but does not pay the price, then the other presses for payment, on which the *aheli* says, "My key has fallen into the sea"; then the owner of the combs tries to catch some of the chickens behind the *aheli*, but the *aheli* prevents him, and there is a continuous struggle between him, and if any of the chickens are caught, he has to become comb-seller.

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[1] A black extract of aloes, used to blacken silver ornaments, and also medicinally.

Main Ayam Jantan. (The Game of Cock.)

This game can be played by three or four, or more. One is selected as chief, and one of the rest is told to go and shut his eyes, and another is made to kneel on the ground, and a cloth is taken and wound round his body, and the remaining player is told to go and hide himself. Then the blind one is called and placed near the one wrapped up in the cloth, and the chief asks the one standing, "Where do you come from, sir?" Reply, "I come from Kĕlantan," (a state on the east coast of the peninsula, next North of Trĕnggânu). Question, "What have you brought?" Reply, "A cock." Question, "Where is it secured?" Reply, "To the post of the bath-house." Then the chief bids the one wrapped in the cloth to raise his voice, so that it is heard by the one standing up, but at the same time disguising it, when a guess is made as to his personality; if the guess is correct, the one covered with the cloth has to go and shut his eyes, but if not correct, the one standing up has to return and do as before.

Main Achîka[1] *duduk.*

Four or five play at this game, and one chases the others. They all cry out, "*achîka duduk, achîka duduk,*" standing together; then the chaser hunts them in all directions; if he gets near, they sit down, and whoever is caught standing becomes chaser. It may happen that the chaser is tired before being able to get near any of the others; if they all sit down he cannot catch any of them.

Main To'Chânа makan bĕlâchan. To' Chânа eats *bĕlâchan.*[2]

As many as like can play at this game; one is taken from the number, and has his eyes bound with a handkerchief or a bit of cloth, so that he cannot see anyone. Then one of the others says, "Oh To'Châna, where is the source, and where is the mouth?" Then To'Châna rushes forward to try and catch one of the others, but they draw out of his way, and some tap his head, and others pull his clothes, and tease him in a variety of ways.

After a time To'Châna sits groping about and whirling round till he is giddy, and in that time, if he is lucky, may come in contact with someone (and catch him) who will have to become To'Châna in his place.

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[1] The name of this game does not seem quite to tally with the description, but anyhow should be written *achikah.*

[2] Sun dried and pounded prawns.

Champak kain (Tossing cloth).

About eight a side play this game; there is a leader to each side. The two leaders cast lots as follows: *pĕrundi* (try by lot) *mĕnchâbut bûlu* (pull or draw a hair), one holds two slips of coco-palm leaf rib in his hand of unequal length, but showing the projecting ends even, so that the drawer cannot guess which is long and which is short. Whoever gets the long one, he and all his followers become riders, and the other side horses.

The horses are arranged at a distance of about 3 fathoms apart from each other in a square figure. Then each mounts his horse like to like (*i.e.*, small on small, big on big, fat on fat, thin on thin, etc.), and the game is begun by tossing a handkerchief filled with sand to the next neighbour on the right hand, and if it is caught, each horse is walked to the place of his neighbour on the right; the handkerchief is then thrown again, and if it is caught, each time the horses are moved on to the right, and so they go on until someone fails to catch the handkerchief, when the horses and riders exchange places; every time the handkerchief is dropped they have to change.

Sometimes an agreement is made beforehand if the handkerchief is sent round without dropping for three times, or such number as may be agreed on; then they walk round the horses for an equal number of times (a sort of march of triumph).

That finishes the game, unless the defeated are dissatisfied, when they can continue, but they must begin as horses.

Main prahu. (Boat game.)

B	54321 54321	A

Two sides play this game, five or more a side, in two rows standing side by side. Two boundary lines are made. No. 1 of each row sits with his feet against line A, and the point is to see which side will first reach line B in the way described below.

No. 1 holds the hand of No. 1 of the other row, and No. 2 No. 2, and so on up to the end of the rows; a leader faces each row; the leaders consult about choosing sides out of the two rows, they agree who shall have first choice; one goes up to the rows and walks down between them, making them separate, and looks at each row (previously arranged so that No. 1 in one row shall be as near the size of No. 1 in the other as possible, and the same with the rest) and decides on taking one row for his side, then his side have to be the hunters; both sides sit down in rows, with extended legs one behind the other, like rowers in a boat; and the leader of the side not chosen takes a stone, and hides it under the legs of one of his side, making a pretence with each; the leader of the opponents has to guess which of them has the stone; if he guesses right, then he takes the stone and hides it with one of his own side, and the other leader then has to guess where it is; but if he guesses wrong, then No. 1 of the side which has the stone removes from his own place to behind No. 5 of his own side, and the stone is again hidden, and whichever side first reaches the other boundary by these removals is the winner.

Main Sabâkul (*Bâkul*, a basket).

Played by two or four; if by four, then by two a side. When the ground has been marked out (Fig. 6), two stones are taken and placed at the end of the lines drawn across the circles for *gondu*, *i.e.*, players that can be moved about. Then lots are cast (to decide who shall begin the game) with four *kĕrang*[1] shells; whoever turns up most shells hollow side up wins, but the best throw is to get all four shells curve side up; if throwers should throw alike, it must go on until one throws better than the other.

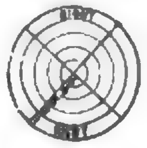

FIG. 6.

If the winner's throw is four face down, he takes his *gondu* to the right completely round the circle, that is called *sabâkul*, and then places it on the second circle; if the shells have fallen all four face up then he moves his *gondu* only a span to the right, then he throws again, for the two above throws are called "live throws" and can be continued for any number of times; but if only three or two or one turn face up, the *gondu* is moved only by inches, according to the number turned face up; these are called "dead throws," and each side throws alternately after them; if four are playing, the partner also throws, and his throws are added to the progress of the *gondu* on his side. If a *sabâkul* throw is obtained, the small steps obtained are lost, and the *gondu* is advanced to the next circle, and whichever *gondu* reaches the inner circle first, the party of the owner wins; and he may win fruit, or money, or whatever may have been staked—or he may strike the losing party with the middle knuckles of his fingers (called *kûti* or *mĕngûti*) as may have been agreed on.

Main mûsang (civet cat).

Is played by ten or more; whoever likes can become a *mûsang*; he sits down and is blindfolded, the two ends of the handkerchief being held by two others, one on each side, who shake them to and fro and sing as follows:—

"*Tok-tok mûsang, tok mûsang bunga lâda,*
Dâtang hantu mûsang, sâékor âyam-pun tiâda
chok galéchok, galéchok gâli ûbi
dimâna tîkus mondok, disîtu dîa mĕnjâdi."

"Sir civet, sir civet,[2]
Comes the civet sprite, and not a fowl is there,
Where'er the mole is seen, he too springs up."

The third line seems descriptive of the sound of the digging of the yam, *gâli ûbi.*

---

[1] *Kĕrang*, a bivalve shell.
[2] Pepper flower.

This is repeated four or five times, then the *mûsang* snatches himself away, and all the others run away and hide close by, only the two remaining; when they are all hidden, the *mûsang's* eyes are uncovered, but he keeps them closed, and one of the two remaining near him, speaking close to his ear, says "*kĕtok kĕtok*" (tap-tap) three times like the noise of a fowl, then they both run away and hide, and a moment after the *mûsang* gets up gently, pretending to sniff the smell of fowls, and walks about in search of the hidden ones. When he meets one of them he chases him, trying to bite him, and the pursued cries out to his comrades "help, help," and they all rush out, bent on catching the *mûsang*, which they attempt to do when they have collected, while he tries to bite one of them; if he succeeds, the victim cries out, but if the *mûsang* should fall into the hands of the others, they take him up with the intention of throwing him into the bushes; and if he is afraid of that, he admits that he is *mâti* (dead) and is thus released: but if he can face it, he is thrown wherever the others like, after which he resumes his chase of them till he can bite one, or is again caught himself.

Main gâli-gâli bĕlongkeng (shell).

Played by five or six. A heap of sand is made, and a *lédi* (slip of coco-palm leaf rib) is stuck upright in it, while the players sit round it, holding each a *lédi*, with which he scoops the sand towards himself, and before whomsoever falls the *lédi* stuck in the sand, he is blindfolded, and sand and the fallen *lédi* are placed in his hand, and he is led to a little distance away, made to throw away the sand and the *lédi*, and then led back to where he started; after which his eyes are uncovered and he is told to look for the *lédi* he threw away; if he can find it, the game is begun over again; if he can't find it, he has to have his eyes covered again, while someone else looks for it.

Usually, when the blinded one is taking the sand and *lédi* in his hand, if he is heedless, someone is sure to take the *lédi* away, so that he searches in vain for it; but if he is smart, he will be sure to grip it with his fingers, so that it cannot be taken from him, and when he throws it away, it must fall where he throws it, and then he has no difficulty in finding it.

Pram-pram pîsang.

This is a game for small children and is played by four or five as follows:—They sit in a ring, placing the palms of their hands on the backs of their neighbours, then they wave them up and down, singing at the same time, "*pram-pram pîsang, pîsang mâsak sabîji, datang bari-bari, gonggong bâwa'lari*" ("The plantains are ripening, as soon as one is ripe, up come the flies[1] and carry it off in their jaws"), and with the last words give a final wave of their hands as they release them. This is repeated as often as desired.

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[1] A small variety with little red bodies, which haunt this and other fruit and plague mankind also; there is likewise a small black variety. Cf. the words in *tong-tong bak* where the maimed crocodile plays the part of the *baribari*.

Main gâlah-gâlah anjing.

This must be played by five or more, but the numbers must be odd and not even. A circle is made on the ground with four radii (Fig. 7); if seven play there must be six radii, and so they continue to increase with the number of players.

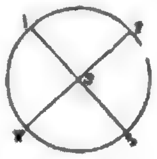
FIG. 7.

When these have been prepared, whoever likes to be *anjing* (dog), takes up his position in the middle, and the others stand where the radii touch the circumference; then the dog says "*yoh! yoh! yoh!*" and the others say "*run, run,*" and each runs to the vacant place next to him, and the dog watches to see whether he cannot run to one of the vacant places before any of the others can; if so, some one will be left without a place, and he has to take the dog's place; if, however, the dog is unsuccessful in ousting any of the players, he must remain "dog."

Main Tang-tang kul atau tikam salâdang.

Five or six play at this; whoever likes can be a *salâdang* (a kind of wild ox or bison which grows to a large size) and another becomes leader of the *salâdang*, and says:

(1) "*tang-tang kul*" (the child's jingle); the *salâdang* replies "*Kĕlâdi uwa-uwa*" (the *uwa-uwa* caladium).

(2) Leader: "*apa di bâkul?*" ("What is in the basket?"); the *salâdang* replies "*hârang pâra*" ("Soot").

(3) "*apa bûat hârang*" ("What is the soot for?"); the *salâdang* replies "*pĕngâsah lĕmbing*" ("To sharpen my spear").

(4) "*tajam, tumpul?*" ("Is it sharp or blunt?"); the *salâdang* replies "*tajam*" ("Sharp").

(5) "*tikamlah*" ("Stab away, then").

Then the *salâdang* kicks out right and left, and those around look out for themselves in order to escape these kicks; if anyone should receive a kick on any part of the leg (*i.e.*, from the thigh downwards) he must become *salâdang*, but if the kick is on the body, it does not matter.

Oftentimes owing to the negligence of the *salâdang* in kicking, he gets caught by his adversaries; then one asks him, "Dead or alive?" Then the *salâdang*, if he thinks he can release himself, replies "alive," and then does his utmost to release himself, so as to get a kick at them, but if he is unable to release himself, he says "dead," and is so; in which he has to become *salâdang* again, and begin kicking right and left.

Main sôrok-sôrok tompok.

Played by two only. Who is to begin is decided by *undi châbût-bûlu*. Two rows of five heaps of sand close to each other are made as shown in Fig. 8.

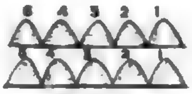

FIG. 8.

Main chĕmpĕlak chempĕlak wang.

Played by eight or ten, not less than five. One of them becomes *îbu* (mother); they all sit down, the *îbu* only squatting cross-legged. Whoever likes can come and bow his head on the lap of the *îbu*, and all the others come and place their hands, palms up, spread over the back of the stooper, and the *îbu* takes a stone, holding it in the tips of her fingers, and counts while dabbing every palm with it, a word of song to every dab, going and returning through all the palms till the song is finished. The song is as follows:—

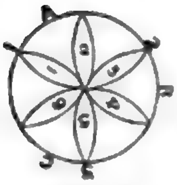

Fig. 9.

1 2 3 4 5
chĕmpĕlak, chĕmpĕlak, wang (money), *wangnya, sîkuranting* (angle of twig),
6 7 8 9 10
mâma (uncle), *tûtû* (cut or pound), *mâma, lâda* (pepper), *Hasan* (grandson of the
11 12 13
prophet), *Husin* (grandson of the prophet), *lârah* (in demand), *lêrah* (a plant),
14 15 16 17
sibâba (Master Baba), *taromboh* (sunken rock), *rombong* (plaited baskets),[1] *yamûna*,
18 19 20 21 22
yamûnu, pĕgang (hold), *bâtu* (stone), *sâlah* (wrong), *sâtu* (one).

Wherever the song finishes, in that hand the stone is placed, and at the same time all close their fists and erect their forefingers lowering and raising them, while the *îbu* keeps on saying "*tam uh, tam uh,*" until the stooper rises and notices all the fists, with a view to guessing which contains the stone, and he points out which he suspects, left hand or right; if he guesses not only the right person, but the right hand, then the holder of the stone has to take his place and become stooper.

But if he fails, he has to go on as stooper, and if he fails ten times, he is taken by the others and swung by the head and feet and tossed into the bushes (*hâyak*).

Main ûti-ûti.

About five or six play this game. One becomes *îbu* and sits down, another comes and bows his head on the *îbu's* lap, shutting his eyes. The others run and hide; when they are all hidden, the *îbu* makes the stooper raise his head, and asks him *ûti! ûti! dimâna siânu itu?*" *i.e.*, "*ûti, ûti,*" "Where is so-and-so?" mentioning the names of the hiders, one after the other; if he guesses that so-and-so is in such a place correctly, the one who is guessed changes place with the stooper; but if he fails to guess up to ten times, then he is *hâyak'd*, and if they go on with the game, he continues to be stooper. (For *hayak* see preceding game.)

Main tang-tang kwît.

This is played as follows by two children. One of the two ropes supporting a swing is removed, and the plank is placed with its centre on the remaining rope and a child sits on each end, and they play see-saw with it, one saying "*tang-tang kwît*"; the other *kwît, kwît.*

---

[1] Made from the leaves of the *mĕngkuang pandan* (*pandanus fascicularis*).

Jongkang-jongket (see-saw).

This is the ordinary see-saw with a piece of wood under the centre.

Main tunggul (stem game).

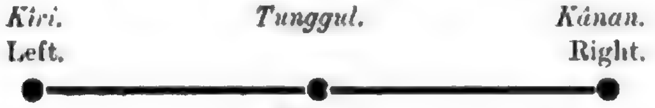

Fig. 10.

One person agrees to become *tunggul* and look after the place in the centre. (See Fig. 10.) Six or eight a side play. When the two sides are ready, the children are separated by the leaders, and the person who has agreed to be *tunggul* chooses his side and goes on the watch.

The two sides sit right and left of the *tunggul* at a distance of five or six fathoms.

Then from the chosen side, one of the party steps up to the *tunggul* and whispers "I want so-and-so," giving the name of one of the opposite party, after which he returns to his place.

Then the *tunggul* tells the other side to send out one of their number, without mentioning the name; on which, that side consult as to whom they shall put forward, their object being to avoid putting forward the one who has been secretly named by the opposition. They then send out their representative; if he has not been named, he goes up to the *tunggul*, and in his turn, gives the name of one of the opposition, who have then to send a representative. So they go on, turn and turn about, till the one put forward is the one named, when his side have to carry all the opposition on their backs over to the other side; the two sides thus changing places. If the game is then continued, the defeated have to begin naming.

Gasing (peg-tops).

A and B wind a long string round their respective tops. A jerks away his top, retaining the string, and thereby setting his top spinning. B follows and tries to knock A's top off the spin, leaving his own spinning.

Jûting (foot-racing).

Mĕnyĕlam (diving).

Two dive and see who can stay longest under water.

Main tûtup mâta (shut eye).

A mark is made on the ground, and the eyes of players are blind-folded in turn. Each, when blind-folded, takes a stick and walks towards the mark, and tries to bring down the stick on it. Whoever gets nearest is best, or if one hits it he may get some prize in the form of money, or win a bet; so also, if more than one hits the mark.

Gôli (marbles).

A and B squat on the ground and jerk a marble or small stone from the forefinger, aiming at a small hole made in the ground to receive it. Three shots are allowed, and whoever can hole the marble in the three shots wins.

Pa'pa' lang (as played in *Pĕrak*).

Twenty or thirty children stand in a circle, sing "*Pa-pa-lang bĕbuntut-buntut*," moving round slowly as they sing.

Main papanchak dan sîlat.

War-dance, springing about (*panchak*) and whirling (*sîlat*) round, combined with a kind of fencing.

Main dâbus.

At great feasts young men take pieces of skewer-shaped (*dâbus*) iron, ornamented at the head with bells or rings, and pierce their arms and legs, afterwards putting warm oil in the wounds. The first who does this, challenges another to do the same; to refuse is regarded as cowardice, and the ancestor, in whose honour the game was instituted, will have nothing to do with one who refuses.

The legend goes that the country (Pèrak) being invaded by a powerful enemy, the ancestor alluded to, assuming the form of a warrior, came to its aid, and as often as he was killed by the enemy, returned to life and renewed the fight over and over again. The invader seeing no prospect of an end to this, withdrew from the country in disgust.

Main pimping.[1]

Resembles "odd man's out." A lot of money is shuffled about. The two players settle which will take heads and which tails (*kĕpâla* and *bunga*). After tossing the coins on the ground, whoever obtains most, heads or tails, is the winner.

Chok-chok kĕndong (Father kite).

Game for small children; one crawls and tries to catch one of the others by the heel. The others slap him on the back, and whoever may be caught by him has to crawl in his place.

Pak-pak hĕlang.

Like *la queue du loup.*

Ping-Hîlang.

Like hide-and-seek.

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[1] The original word was perhaps *ping-ping* from the *sound of the coin*, having come to be sounded and written *pimping.*

ON THE PHYSICAL ANTHROPOLOGY OF THE OASES OF KHOTAN AND KERIYA.

(BASED ON ANTHROPOMETRICAL OBSERVATIONS MADE BY DR. M. A. STEIN DURING HIS RECENT ARCHÆOLOGICAL EXPLORATIONS IN CHINESE TURKESTAN.)

[WITH PLATES XXVI, XXVII.]

BY T. A. JOYCE, B.A.

INTRODUCTION.

FEW words are necessary by way of introduction to the measurements taken by Dr. Stein on inhabitants of the oases of Khotan and Keriya in Chinese Turkestan, known in the Celestial Empire as the province of Sin-Kiang.[1] The ethnology of Central Asia is very puzzling owing to the large number of different racial elements which are to be found there, and the comparatively small amount of exact anthropological data relating to the inhabitants of this vast tract of country which is available. In fact, Dr. Stein's measurements are the first which have been secured from this particular neighbourhood, and, in consequence, possess peculiar interest and importance. It should be borne in mind that the aims of the expedition were purely archæological, and that the season during which excavation is possible is limited; consequently as much time as was available had to be spent on the sites in the desert, and the inhabited areas were only visited *en route*. It is all the more gratifying, therefore, that in the midst of his important archæological work, and with no material other than his actual labourers, Dr. Stein should have found time, after a hard day's work, to devote himself to the collection of anthropological data. It is sincerely to be hoped that other archæologists may be inspired to follow his example, especially in regions where the physical difficulties to be overcome are less serious. Under the circumstances it is not to be expected that the measurements of a large number of subjects could be obtained, but it is rather a cause for congratulation that the collection of any has been possible.

With regard to the deduction therefrom of a theory as to the race or races which enter into the composition of the inhabitants of these oases, it must be admitted that the material is somewhat small for the attainment of any degree of certainty, and all conclusions must be regarded as purely tentative, to be confirmed or refuted by further researches. At the same time, an analysis of the data to hand will not be without value as showing certain tendencies of the people, and, it is to be hoped, may serve as a stimulus to further discussion and inquiry.

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[1] For an account of Dr. Stein's journey, see his recently published work, *Sand-Buried Ruins of Khotan*, London (Unwin), 1903, also the *Geographical Journal*, December, 1902.

It may, perhaps, be thought that the opinions expressed from time to time have been stated somewhat over-boldly; but it has seemed most scientific to adopt as concise and clear a method of statement as possible, and it is to this fact that any apparent dogmatism must be traced.

The conclusions which have been attained, have been based as far as possible on evidence purely anthropological in character; that is to say, the history of the country and the testimony of its archæology have been left outside consideration as far as is consistent with an adequate investigation of the nature of the inhabitants. This seemed to be the best and surest method of arriving at sound conclusions in view of the numerous problems which still beset the study of the early history and ethnography of this part of Central Asia.

The number of Sarikolis and Yarkandis measured is, of course, insufficient for profitable discussion; all that can be said about them is that the former appear to resemble the Galcha type more closely than the Khotanese, although the cephalic index (73) of C. appears somewhat of a stumbling-block. Certainly, the characteristics of the ***Homo Alpinus*** of Lapouge appear very strongly delineated in the subjects measured. It is probable, as suggested by other authors, that the Pamir valleys may contain the purest representatives of the tall, white, brachycephalic, leptorhine, brown- and wavy-haired race whose physical traits appear to have been inherited in varying degree by so many of the present neighbouring populations.

The numbers attached to the individuals represent the order in time in which each was measured, the actual grouping of the latter is based on the localities of which each was an inhabitant. The measurements obtained on inhabitants of Tawakkel have in all cases been included with those obtained at Khotan, since Dr. Stein has shown that the small Tawakkel oasis was colonised in comparatively recent times by people from various tracts of the Khotan oasis.

The various anthropological data have been collected in accordance with the instructions given in *Notes and Queries on Anthropology*, published by the Anthropological Institute.

It will perhaps be best to compare the data obtained from the two oases of Khotan and Keriya before entering into any discussion of the peoples of the Tarim basin as a whole, since the differences which will be found to exist between these two groups may throw some light upon the elements which have combined to form the present populations. From the history of the Asiatic Continent it would hardly be expected that the latter could in any way approximate to the ideally "pure race," which is so dear to the imagination of the anthropologist, and the width of range, and irregularity of the measurements fully support this view. That the race is a "compound" rather than a "mixture" (to employ terms borrowed from chemistry) I hope to prove later.

As the measurements have been taken over a scarcely sufficient number of subjects to warrant the construction of binominal curves, it has seemed best to effect any comparisons which may be necessary by means of a system of percentages.

CEPHALIC INDEX.

With regard to the classification of the cephalic index, a word of explanation is necessary. Owing to the high degree of brachycephaly attained by a large number of the subjects measured, the classifications of Flower and Broca are not sufficiently far-reaching; for purposes of comparison, therefore, the indices of 80 and over, have been divided into three groups, 80 to 84·9, 85 to 89·9, and 90 and over, respectively. I venture to think that this division is a trifle more convenient than that employed by Dr. Deniker, since it is less elaborate and minute.

Cephalic Indices.

	Under 80.	80–84·9.	85–89·9.	90 and over.	Average.	Most dolicho.	Most brachy.
Khotan (22) ...	2	10	9	1	84·4	77·6	90·2
Keriya (16)... ...	1	6	5	4	86·9	79·7	96·9
Khotan (per cent.)...	9·1	45·4	40·9	4·5	—	—	—
Keriya (per cent.) ...	6·2	37·5	31·2	25·0	—	—	—

From these figures it appears, that while the inhabitants of both oases are remarkably brachycephalic, the cephalic indices of the population of Keriya are more evenly distributed over the three highest divisions, and there seems to be a greater tendency to hyperbrachycephaly among them than among the inhabitants of Khotan. A word of warning may be inserted here, and should be kept in mind whenever the question of the cephalic index of this people is under discussion.

Grenard,[1] in describing the general physical type of the inhabitants of Chinese Turkestan, remarks on the remarkable flattening of the occipital region of the head, which gives the latter its peculiar "sugar-loaf" or cuboid aspect; he continues, "*L'aplatissement de l'occiput est dû, au moins dans une certaine mesure, au berceau de bois sur le fond dur duquel la tête encore malléable de l'enfant s'appuie et se heurte.*" In this manner is produced a false brachycephaly which might be misleading, and which renders the cephalic index too unreliable to become, by itself, the basis of any theory as to race.

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[1] J. L. Dutrueil de Rhins, *Mission Scientifique dans la Haute Asie*, 1890–1895, 2ième partie, *Le Turkestan et le Tibet*, par F. Grenard, p. 12.

NASAL INDEX.

In dealing with the nasal index the usual classification has been followed viz.:—leptorhine, under 70; mesorhine, 70–85; platyrhine, 85 and over.

	Lepto-rhine.	Meso-rhine.	Platy-rhine.	Average.	Most lept.	Most plat.
Khotan (23)	8	15	0	71·7	50·0	83·3
Keriya (16)	0	11	5	81·1	70·0	92·9
Khotan (per cent.) ...	34·8	65·2	0	—	—	—
Keriya (per cent.) ...	0	68·7	31·2	—	—	—

Here the difference between the two series of measurements is very marked, and the result is very surprising. It is more than possible that the contrast between the two may have been exaggerated by mere chance, and that a larger number of measurements might render it less striking. However, there seems no doubt that the population of Khotan is more leptorhine than that of Keriya. A study of the absolute measurements will show that this is due to a greater nasal length in the case of the former; the nasal width being approximately the same in both cases.

Nose Shape.

In connection with the nasal index, it will be as well to examine the nasal form, classed under four heads, aquiline, sinuous, straight and concave.

	Aquiline.	Sinuous.	Straight.	Concave.
Khotan (23)	1	9	13	0
Keriya (16)	1	3	10	2
Khotan (per cent.) ...	4·3	39·1	56·5	0
Keriya (per cent.) ...	6·2	18·7	62·5	12·5

Only a single true aquiline occurs in each series, but on the whole the population of Khotan shows a greater tendency towards this type, although in each case the straight form appears typical.

FACIAL INDEX.

In this case an index has been obtained by Kollmann's method of correlating the facial height, measured from nasion to chin, with the bizygomatic breadth = 100; and the division into leptoprosopic (90 and over), mesoprosopic (85–90), and euryprosopic (under 85), has been adopted.

	Lepto-prosopic.	Meso-prosopic.	Eury-prosopic.	Average.	Most lept.	Most eury.
Khotan (23)	9	3	11	87·4	101·7	78·2
Keriya (16)	1	6	9	82·4	90·3	70·1
Khotan (per cent.) ...	39·1	13·0	47·8	—	—	—
Keriya (per cent.) ...	6·2	37·5	56·2	—	—	—

The small range of the mesoprosopic division probably accounts for the larger number of indices which fall on each side of it in the case of the population of Khotan; but these indices, although they cover a wider range, show a tendency to leptoprosopism which is absent among those of the population of Keriya. This characteristic appears in the shape of the face viewed from the front.

	Long and narrow.	Medium.	Short and broad.	Wedge-shaped.
Khotan (23)	5	13	3	2
Keriya (16)	1	8	6	1
Khotan (per cent.) ...	21·7	56·5	13·0	8·7
Keriya (per cent.) ...	6·2	50·0	37·5	6·2

Prosopism.

In this connection, the question of prosopism, or shape of face viewed in profile relative to the projection of the cheekbones, may also be considered.

	Proprosopic.	Moderately proprosopic.	Medium.	Platyprosopic.
Khotan (23)	2	9	12	0
Keriya (16)	0	4	10	2
Khotan (per cent.) ...	8·7	39·1	52·2	0
Keriya (per cent.) ...	0	25·0	62·5	12·5

As might be expected, the greater breadth of face found at Keriya is accompanied by a more perceptible projection of the cheekbones, which renders the face flatter when viewed in profile.

Stature.

In accordance with the accepted method, the measurements of height have been divided into four classes, viz.:—short, under 1600 mm.; under average 1600–1649; over average 1650–1699; and tall 1700 and over. The result shows a further difference between the two populations.

	Short.	Under average.	Over average.	Tall.	Average.	Shortest.	Tallest.
Khotan (19) ...	5	5	4	5	1645	1545	1780
Keriya (15)... ...	8	4	3	0	1589	1500	1660
Khotan (per cent.)...	26·3	26·3	21·0	26·3	—	—	—
Keriya (per cent.) ...	53·3	26·6	20·0	0	—	—	—

Here the width of range and evenness of distribution of the measurements obtained from Khotan are noticeable when compared with the tendency to short stature observed at Keriya.

Hair, Eyes and Lips.

A few of the descriptive characteristics not directly related to measurements are summed up below.

Individuals whose hair had already turned grey are, of course, excluded from the first table.

Hair.

	Fair.	Light brown and medium.	Dark brown.	Black.
Khotan (20)	2	3	9	6
Keriya (16)	1	1	7	7
Khotan (per cent.) ...	10·00	15·00	45·00	30·00
Keriya (per cent.) ...	6·25	6·25	43·75	43·75

Eyes.

	Light, including blue.	Medium.	Dark brown.
Khotan (23)	1	18	4
Keriya (16)	3	10	3
Khotan (per cent.)	4·3	78·3	17·4
Keriya (per cent.)	18·7	62·5	18·7

Lips.

	Thin.	Medium.	Thick.
Khotan (23)	8	12	3
Keriya (16)	2	11	3
Khotan (per cent.)	34·8	52·2	13·0
Keriya (per cent.)	12·5	68·7	18·7

With regard to these points, the differences do not seem so clearly defined, and may be due more to insufficiency of evidence than to anything else; if anything is to be said it is that the inhabitants of Khotan appear to have slightly fairer hair and thinner lips than those of Keriya, and that their eyes are more uniformly medium.

SUMMARY.

From the above comparison of physical characteristics the following conclusions may be obtained.

Both populations are highly brachycephalic; and although no very great difference is observable, there appears to be a greater tendency to hyperbrachycephaly at Keriya than at Khotan. At the same time, in both cases the height attained by the indices is due in some degree to artificial deformation.

Both are mesorhine in the main, the inhabitants of Khotan with a strong tendency to leptorhiny, those of Keriya to platyrhiny; the typical form of nose is straight, the Khotanese showing a tendency to the sinuous type; only two instances of the concave form occur, and both of these at Keriya.

At Keriya a strong tendency to euryprosopism is observable, at Khotan a tendency in each direction; that towards leptoprosopism being stronger in degree than in number of instances, that towards euryprosopism *vice versâ*.

At the same time the people of Khotan is more inclined to proprosopism than that of Keriya, the latter being mainly mesoprosopic.

At Keriya short stature appears to be the rule, average stature is rarely exceeded: at Khotan appears a peculiar "out-crop" of statures above the average, extending into the lower terms of the "tall" division.

At Keriya dark brown hair and medium eyes and lips seem to be the rule; at Khotan the same applies, with the exception that there appears to be an occasional tendency to fairer hair and thinner lips.

Waviness of hair is almost uniformly common to both, only one instance of straight hair occurs, and that at Khotan; in all cases but four the growth is either abundant or medium; in two cases it is scanty (one of these is a boy of 15) and in two absent. These four occur at Keriya.

Lastly, and so placed because I think it is especially noteworthy, the skin-colour of the inhabitants of both oases is described with one exception as "White Rosy."

THAT THE PEOPLE OF KHOTAN AND KERIYA ARE NOT A MERE MECHANICAL MIXTURE OF HETEROGENEOUS ELEMENTS.

In attempting to prove that the populations of Khotan and Keriya are not a mere "unfused" mixture of the flotsam and jetsam of a number of races, no better system can be employed than that adopted by Mr. T. H. Holland in his admirable paper on the Kanets of Kulu and Lahoul.[1] Both here, and in a previous paper, dealing with the Coorgs and Yeruvas,[2] he points out that where a people is the result of a mere admixture of unaltered constituents, a certain number of individuals will be found who show a marked tendency to the extreme in all the various physical characteristics; but "that *atavistic* tendencies on the part of individuals when shown in one particular physical feature" are "not maintained uniformly in all characters."

The index in which the population of Khotan differs most widely from that of Keriya is the nasal index; since in the case of the former no instance of platyrhiny, in that of the latter no instance of leptorhiny, appears. If then the more leptorhine of the people of Khotan exhibit the peculiar characteristics of the Khotanese, as opposed to those of the people of Keriya, in exaggerated form, it will be clear that the differences between the two are due to the presence of unaltered constituents belonging to another race. Substituting the word "platyrhine" for "leptorhine," this sentence applies to the people of Keriya.

Should this not prove to be the case, it may be supposed that the population in each instance is a "compound" rather than a "mixture."

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[1] *Journ. Anthrop. Inst.*, xxxii, 1902, p. 110.

[2] *Journ. Asiatic Soc. Bengal*, lxx (iii), 1901, p. 90.

To take the Khotanese first:—

	Nasal Index.	Stature.	Facial Index.	Cephalic Index.
Average of whole ...	71·7	1645	87·4	84·4
No. 27	50·0	1615	*101·7*	*83·6*
„ 30	60·8	*1665*	*94·6*	87·1
„ 2	64·8	—	78·4	86·7
„ 4	65·0	—	*88·4*	*77·6*
„ 35	65·3	1615	78·2	*83·0*
„ 32	66·7	1545	82·7	90·2
„ 24	68·5	1590	*90·1*	88·8
„ 22	69·8	*1780*	83·5	*80·4*
„ 25	70·6	1612	*92·5*	86·8

In the first column are the indices of those individuals who exceed the mean in leptorhiny; in the next three columns are given respectively the statures, and facial and cephalic indices of the same, and where the mean, in the direction of tall stature, leptoprosopism, or dolichocephaly has been exceeded, the measurement or index has been italicised.

In the result, only two individuals, Nos. 30 and 22, are found to exceed the mean in stature as in leptorhiny (it is true that two of the measurements in the column relating to the former are wanting, but both of these individuals are more brachycephalic than the mean, and one more euryprosopic also). Of these only one (No. 30) is at the same time more leptoprosopic, but his cephalic index places him among the most brachycephalic of the Khotanese.

With regard to the facial index, five individuals are more leptoprosopic and more leptorhine than their fellows, Nos. 27, 30, 4, 24 and 25. Of these, however, the last two are shorter and more brachycephalic than the average. No. 27 is very interesting as being both the most leptorhine and most leptoprosopic of the whole number; he is also a trifle more dolichocephalic, but attains only 1615 mm. in stature. No. 4, who may be an extreme case, has a wedge-shaped face.

Thus no single instance exceeds the mean in all four characteristics, and only four instances in three characteristics. Of the latter, the cephalic index, which is untrustworthy for reasons stated above, is included in three instances.

It has been noticed that by far the greater number of the Khotanese are either leptoprosopic or euryprosopic; that neither of these two tendencies to leptoprosopism or euryprosopism carries with it any other distinguishing characteristic, can be proved at once.

Of 9 *leptoprosopic individuals*, 3 are leptorhine, 6 mesorhine, 5 have straight noses, 4 sinuous, 3 are tall, 1 is over average, 2 under average, 3 short.

Of 11 *euryprosopic individuals*, 4 are leptorhine, 7 are mesorhine, 6 have straight noses, 5 sinuous; of 9, 2 are tall, 2 are over average, 3 are under average, 2 are short.

It is unnecessary to go farther, but a similar result can be obtained from a summary of the other characteristics.

To apply a similar treatment to the people of Keriya :—

	Nasal Index.	Stature.	Facial Index.	Cephalic Index.
Averages of the whole...	81·1	1589	82·4	86·9
No. 13	92·9	1660	*76·3*	*89·9*
„ 20	90·0	*1565*	*80·2*	82·0
„ 10	88·1	*1580*	85·5	82·1
„ 21	87·8	1590	*81·7*	86·4
„ 8	85·1	1610	85·4	*91·3*
„ 9	83·7	*1530*	*70·1*	83·1
„ 16	83·0	1600	84·3	79·7
„ 11	81·6	1600	*73·0*	83·2
„ 17	81·6	1595	86·4	*89·2*

Thus only three of the more platyrhine of the inhabitants of Keriya are also shorter than the average (Nos. 20, 10 and 9). Of this three, two are more euryprosopic as well (Nos. 20 and 9). Of the latter, No. 20, is evidently an extreme case, since his face is described as short and broad, his nose as a concave, and he exhibits tendencies to prognathism and a glabrous skin.

No. 9 is more dolichocephalic than the average, and in other respects is perfectly normal.

Euryprosopism seems to be a fairly constant accompaniment of platyrhiny, but since the latter among the people of Keriya has been seen to be due to a decrease in length of nose rather than an increase in breadth, this is not surprising.

To summarize; no single individual exceeds the average in all four of the characteristics. Three individuals exceed in three characteristics, one including the cephalic index. Of the other two, No. 20, might be regarded as heterogeneous, but No. 9 appears in other points to be normal.

ETHNIC AFFINITIES OF THE INHABITANTS OF KHOTAN AND KERIYA.

In glancing over the physical characteristics of the inhabitants of these two oases with a view to connecting them with one or other of the great racial stocks of Asia, the anthropologist cannot fail to be struck by the general absence of those traits which are recognized as distinguishing the Mongolian. The skin colour is in no case described as yellowish, and only once as brownish-white, only a single instance of straight hair occurs, there are only two glabrous individuals, the percentage of brown eyes is low, and the fold covering the caruncula is actually present in only one case, and in rudimentary form in three cases. The absence of Mongolian characteristics cannot, however, be regarded as surprising; the same point has been noted by many travellers and anthropologists. Grenard[1] comments on the comparatively tall stature, well developed pilous system, moderate proprosopism, and non-Mongolian character of the eye, which occur in so large a percentage of the population.

Ujfalvy puts forward the theory that "in prehistoric times the Eranians, brachycephalic and brown-haired, settled on the banks of the Aralo-Caspian Sea. A certain number crossed the Pamir and established themselves in the Tarim-basin . . . as cultivators, there meeting the ancestors of the Chinese, who were struck with their horse-faces."[2] It is unnecessary now to prove the existence of the European type in and around the Pamirs and the Hindu-Kush; for this, a reference to the works of the authors mentioned above, and of J. Biddulph, is sufficient. Indeed, the presence of this type was noticed as early as the year 1602, when the Jesuit Goez found a likeness between the inhabitants of the Pamir valleys and the Belgians.

From the fact that the Turki language is universal in the Tarim basin, it would be not unreasonable to suspect the presence of Turkish blood as an element in the composition of the inhabitants. At this point a difficulty arises—the difficulty of stating what is the true "Turkish" type, or whether indeed the race is not the result of an admixture in varying proportion, according to locality, of Aryan and Mongol stocks. Certainly both the so-called "Uzbegs" and "Sarts" are mixtures of many heterogeneous races and nationalities. Consequently it seems inadvisable to include in the present sketch any measurements taken on subjects to whom this name is applied.

Deniker,[3] generalising from particulars gathered from the works of many authorities, has pronounced the characteristics of the Turkish type to be the following:—"Stature above the average (167–168), hyperbrachycephalic (85–87) elongated oval face, non-Mongol eyes, but often with external fold of eyelid, pilous system moderately developed, broad cheekbones, thick lips, straight, somewhat prominent nose." He further mentions the Kara-Kirghiz as one of the peoples among whom this type has been preserved in the greatest purity. In this opinion he is supported by Keane, although the latter admits that Radloff is to a certain extent correct, when he describes the Kirghiz as, of all Turks, the most nearly allied to the Mongols in their physical characteristics.

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[1] *Loc. cit.*

[2] Ujfalvy, *Les Aryens au nord et au sud de l'Hindou Kouch.*

[3] *The Races of Man*, p. 377.

Though the data from Khotan and Keriya correspond in certain particulars with Deniker's definition of a "Turk" as given above, it is clear, mainly from the evidence afforded by stature, lips and eyes, that Turkish blood can be present only in diluted form. That the diluent element is not Mongolian alone can be seen by comparing the Kara-Kirghiz figured on Pl. XXVII with the photographs of the inhabitants of the oasis.

In support of this comparison are appended a few figures obtained from data published by Ujfalvy[1] and Troll.[2]

Nasal Index.

	Leptorhine.	Mesorhine.	Platyrhine.
36. Kara-Kirghiz ..	25·0	47·2	27·8
23. Khotan	34·8	65·2	0
16. Keriya	0	68·7	31·2

Nasal Form.

	Busqué.	Aquiline.	Sinuous.	Straight.	Concave.
26. Kara-Kirghiz ...	7·7	11·5	—	57·7	23·3
23. Khotan... ...	—	4·3	39·1	56·5	0
16. Keriya	—	6·2	18·7	62·5	12·5

Hair Colour.

	Fair.	Brown.	Black.
26. Kara-Kirghiz ...	0	42·3	57·7
20. Khotan	10·0	60·0	30·0
16. Keriya	6·25	50·0	43·75

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[1] *Mission Scientifique en Russie, Siberie, et dans le Turkestan*, vol. iii.

[2] *Verhandlungen der Berliner Anthropologischen Gesselschaft*, vol. xxii.

Stature.

	Short.	Under average.	Over average.	Tall.
26. Kara-Kirghiz ...	0	11·5	30·8	57·7
19. Khotan	26·3	26·3	21·0	26·3
15. Keriya	53·3	26·6	20·0	0

Facial Index.

	Leptoprosopic.	Mesoprosopic.	Euryprosopic.
10. Kara-Kirghiz ...	20·0	30·0	50·0
23. Khotan	39·1	13·0	47·8
16. Keriya	6·2	37·5	56·2

From these percentages taken with the description given above, it seems that there is little in common between the Kara-Kirghiz on one side and the inhabitants of the oases on the other.

It appears then improbable that any Mongolo-Turki tribes can enter largely into the composition at least of the inhabitants of Khotan, and it will be better to seek a comparison with a people of "Aryan" stock. Of these, there are several from which a choice might be made. First of all the Galchas of the northern slopes of the Hindu-Kush, who seem to be a variety of *Homo Alpinus*, and for whom Ujfalvy is the chief authority. He terms them *Savoyards attardés*, and describes them as tall, of white-rosy complexion, black or chestnut hair, light or medium eyes, long shapely curved nose, thin lips, and oval face. Capus and Zaborowski regard them as being of fairly pure stock. They are probably related to the Siah-posh Kafirs, and the natives of Sarikol, Shignan, Chitral and Wakhan (Biddulph). The last named, to judge from the individuals figured in Plate XXVII, show some resemblance to the peoples of Khotan and Keriya. This Alpine race appears again among the Baluchi, according to Keane, but much diluted with Indo-Afghan and Hindu elements. Now there seems little in common between the people of the Tarim basin and the Indo-Afghan, whose distinguishing characteristics are a high stature combined with dolichocephaly and brownish complexion, but it is interesting to note that Dr. Stein was struck by a certain similarity in general appearance between the Kashmiri and the Khotanese.

Now the Kashmiri are undoubtedly to be connected with the Indo-Afghans, yet they present such a peculiar and unmistakable type that the comparison is noteworthy. Robert Shaw[1] says of them, "the Cashmeerees form as well-marked a type as that of the Jews. No one who has seen them would hesitate to swear to the nationality of one of them in a Court of Justice."

Their characteristics according to Ujfalvy[2] are the following:—forehead high and curved, sometimes retreating, superorbital ridges well developed, root of nose depressed, brows arched and thick, nose large and arched, lips thin, beard full, zygomatic arches prominent, massive chin, extremities large, hair black and wavy. The Kashmirian is "*L'Aryen Montagnard qu'un mélange de cinq siècles avec des éléments differents a épaissi sans réussir à lui enlever cependant son cachet aryen.*" Of 30 individuals measured by him, the average cephalic index was 72·5, and the stature above the mean.[3]

From the Kashmiri to the neighbouring Dards is but a short step, especially as the relation of the latter to the former has been proved both on historical and linguistic grounds. They are regarded by Ujfalvy[2] as "Aryans" in the main with a certain amount of Dravidian admixture in some of the tribes. As they seem of a somewhat elusive type, I do not attach any very great importance to their measurements; still the latter may be not without interest. They are described as possessing, in the main, black wavy hair (though this is the exception among the women), brown, medium, and even blue eyes, finely shaped nose, and rather dark skin.

One other people might, on geographical grounds, be supposed to have had an influence over the type current in the Tarim basin, the Tibetans, since there has been ample opportunity of communication between Tibet and the oases. Now the question as to what is the Tibetan type has not been satisfactorily answered. Keane has remarked very truly, that "owing to the political seclusion of Tibet, the race has hitherto been studied chiefly in outlying provinces beyond the frontiers . . . . in districts where mixture with other races may be suspected." It is, however, certain that the majority of the present inhabitants are Mongolians, and of these a certain number of measurements have been secured by Risley in Ladakh. It appears, however, that the Tibetans are not all wholly Mongolian. Rockhill[4] mentions a wide-spread type which he terms the "Dru-pa type," and which he regards as comparatively pure. This people he describes in the following terms:—"Among the Dru-pa Tibetans the males measure about 5 feet 5 inches (approximately 1620 mm.); the females not appreciably less. The head is brachycephalic, the hair, when worn, is nearly invariably wavy; the eyes are usually of a clear brown, in some cases even hazel; the cheek-bones are high, but not so high as with the Mongols; the nose is thick, sometimes depressed at the root, in other cases prominent, even aquiline, usually narrow, but the nostrils are broad . . . the lips not very full, and among the people in the lower regions decidedly thin; the beard is very thin." Later on, however, he says that he has "seen a few men in Central Tibet . . . with tolerably heavy beards. . . ."

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[1] *Visits to High Tartary, Yarkand and Kashgar*, p. 27.

[2] *Bull. Soc. Anth.*, Paris, 1889.

[3] I have, unfortunately, been unable to discover whether the individual measurements of these thirty Kashmiri have been published.

[4] "Notes on the Ethnology of Tibet," pp. 673, 674, *Smithsonian Report*, 1895.

Rockhill's observations are corroborated by Grenard,[1] though the latter lays stress on the impossibility of distinguishing a general type.

It is of course impossible, at present, even to conjecture whether these may prove to be a remnant of the original inhabitants, in which case it would be not unreasonable to suppose that a certain percentage may have reached the Tarim basin through Tsaidam, and become merged in the population of the oases; or whether the oases themselves may not have been the source from which they penetrated to Tibet. In any case, it seems probable that if measurements of this people could be secured, they would show considerable affinities with those of the people of Khotan and Keriya. Subjoined in tabular form are a few anthropometrical and descriptive details of some of the above mentioned peoples.

Cephalic Index.

	Under 75.	75–79·9	80–84·9	85–89·9	90 and over.
58. Galchas[2] ...	0	12·0	25·9	50·0	12·0
22. Khotan... ...	0	9·1	45·4	40·9	4·5
60. Baluchi[3] ...	10·0	36·7	40·0	11·7	1·7
80. Pathans[3] ...	31·25	52·5	13·75	2·5	0
44. Dards[4]	40·9	47·7	11·4	0	0
31. Ladakhi[4] ...	19·4	67·7	12·9	0	0
38. Tibetans of Tibet.[3]	2·6	36·8	47·4	13·2	0
16. Keriya	0	6·2	37·5	31·2	25·0

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[1] *Loc. cit.*, p. 323.

[2] Ujfalvy, *Expédition Scientifique*, etc., vol. i.

[3] Risley, *Tribes and Castes of Bengal.*

[4] Ujfalvy, *Aus dem Westlichen Himalaja.*

Stature.

	Short.	Under average.	Over average.	Tall.
58. Galchas	6·9	25·9	36·2	31·0
19. Khotan	26·3	26·3	21·0	26·3
60. Baluchi	8·3	16·7	45·0	30·0
80. Pathans	6·25	17·5	31·25	45·0
41. Dards	18·6	32·6	27·9	20·9
31. Ladakhi	19·4	51·6	19·4	9·7
35. Tibetans of Tibet...	22·9	28·6	25·7	22·7
15. Keriya	53·3	26·6	20·0	0

Nasal Indices.

	Leptorhine.	Mesorhine.	Platyrhine.
58. Galchas	22·4	60·3	17·2
23. Khotan	34·8	65·2	0
60. Baluchi	53·3	45·0	1·7
80. Pathans	56·25	43·75	0
41. Dards	73·2	26·8	0
31. Ladakhi	29·0	41·9	29·0
Tibetans of Tibet...	39·5	44·7	15·8
16. Keriya	0	68·7	31·2

Nasal Form.

	Busqué.	Aquiline.	Sinuous.	Straight.	Concave.
58. Galchas... ...	6·9	60·3	—	24·1	8·6
23. Khotan	—	4·3	39·1	56·5	—
44. Dards	18·3	38·6	9·1	27·3	6·8
29. Ladakhi ...	22·6	12·9	3·2	35·5	25·8
16. Keriya	—	6·2	18·7	62·5	12·5

Hair Colour.

	Fair.	Red.	Medium.	Dark brown.	Black.
53. Galchas... ...	9·4	1·9	28·3	50·2	9·4
20. Khotan	10·0	0	15·0	45·0	30·0
35. Dards	0	0	11·4	28·6	60·0
27. Ladakhi ...	3·7	0	7·4	40·7	48·1
16. Keriya	6·25	0	6·25	43·75	43·75

Eye Colour.

	Light.	Medium.	Dark.
58. Galchas	20·7	60·3	19·0
23. Khotan	4·3	78·3	17·4
44. Dards	25·0	47·7	27·3
31. Ladakhi	9·7	35·5	54·8
16. Keriya	18·7	62·5	18·7

Lips.

	Thin.	Medium.	Thick.
58. Galchas	53·4	41·4	5·2
23. Khotan	34·8	52·2	13·0
44. Dards	20·5	70·5	9·1
31. Ladakhi	16·1	67·7	16·1
16. Keriya	12·5	68·7	18·7

Conjointly with the above tables might be studied the following short descriptions of the races to whom the measurements, etc., refer, generalised from the works of the authors mentioned above in the course of the paper, and headed by Lapouge's *Homo Alpinus*, who seems to have been the common ancestor of so many of the Pamir people, and even to have extended over the Tarim basin when the latter, through extensive irrigation, was possessed of more numerous and larger oases.

1. A white-rosy race, very brachycephalic, stature above the average, with thin prominent nose, varying from aquiline to straight, long, oval face, hair brown, usually dark, always abundant and wavy, eyes medium in the main. This is Lapouge's *Homo Alpinus*.

2. A race also white, but with a slight tendency to brownish, also very brachycephalic and with stature above the average, nose broader and usually straight, cheekbones broad, hair straighter, darker, and less abundant, eyes dark. The "Turkish" race.

3. A brown, mesaticephalic, tall type, thin, prominent, and aquiline nose, long, oval face, black, wavy hair, dark eyes. This race may be termed the Indo-Afghan.

5. A brownish, brachycephalic race, stature under average, nose straight, thick and broad, black, wavy hair, little on face, brown eyes. The Tibetans.

6. A yellowish, brachycephalic, short race, short, flattened nose, with broadish nostrils, straight or concave, short, broad face, straight, black hair, scanty on face, dark, oblique eyes, with fold covering the caruncula. The Mongolian race.

Taking the Galchas as fairly pure representatives of the first type, the Baluchis seem to occupy a position between them and the Indo-Afghans, though more closely allied to the latter. The same may be said of the Dards, with the exception that in this case the Indo-Afghan element is not nearly so strong, and the presence, probably, of a Dravidian strain has tended to lower the cephalic index and stature.

The characteristics produced by a very strong infusion of Mongolian blood are well seen in the Ladakhis. The Tibetans of Tibet measured by Risley were probably of very mixed type.

To come to the people of Khotan, it is interesting to note that in their complexion, character and colour of hair and eyes, and cephalic index, is shown a very close correspondence with the Galchas, in fact they seem to bear a general resemblance rather to this than any other type. Nor is this surprising when it is seen from the accompanying photographs how closely the Wakhi and Khotanese approach one another in outward appearance. A certain number of differences, however, appear in other particulars. There seems to be a tendency to a somewhat darker complexion, as shown by No. 5, who is described as "white-brownish"; the hair, while maintaining its wavy character, is inclined to be darker, and the percentage of blacks is much higher. The same tendency to a darker tint is observed with regard to the eyes; and the lips are slightly thicker.

When the statures are examined, the difference is greater. While a fair percentage of the population are tall, there exists at the same time an equal number who are below the average, and again an equal number who are short.

	J.	K.	No.	RKS.
gna- m.	Lips.	Prominence or flatness of face.		
sent	Medium	Mod. proprosopic	22	g of Karakash.
,	Thin	Mesopros.	24	mad Shah Imam,
,	„	Mod. propros.	25	rader, Karakash.
.	Medium	Propros.	26	Abdullah, weaver,
	„	Mod. propros.	27	; son of Yusuf Karakash.
.	„	Propros.	28	aker, Karakash.
	„	Mesopros.	29	Mullah, cultivator,
	„	„	30	d Ali, cultivator,
	„	Mod. propros	31	vator, Karakash.
	Thin	„ „	32	a, cultivator, Kara-
	Medium	Mesopros.	33	vator, Karakash.
	Thin	„	34	other of above),
	„	Mod. propros.	35	ivator, Karakash.
	„	Mesopros.	36	f, cultivator, Kara-
	Medium	„	37	ice headman.
	„	Mod. propros.	38	oja, weaver, Kara-
	Thin	Mesopros.	39	shoemaker, Kara-
	Medium	Mod. propros.	1	
	Thick	Mesopros.	23	ja, leather-worker.
	Medium	Mod. propros.	2	
	Thin	Mesopros.	3	
	Thick	„	4	
	„	„	5	

100, it is possible that some mistake

ovember 27th, 1900.	Nos. 15–20
r 30th, 1900.	„ 21–23
1901.	„ 24–39

H. Profile of nose.	I. Prognathism.	REMARKS.
Straight	Slight	cultivator of Keriya.
”	Absent	” ”
”	”	” ”
Concave	”	” ”
Straight	”	” ”
Sinuous	”	Keriya weaver.
Straight.	”	” shepherd.
”	”	escribed as Mullah; son of r.
Aquiline	”	cultivator, Keriya.
Straight	”	” ”
Concave	Slight	” ”
Straight	Absent	Moltudimet, cultivator, Keriya.
Sinuous.	”	shepherd.
Straight	”	weaver.
”	”	shepherd.
Sinuous	Slight	”
Straight	Absent	
”	”	
”	”	
Straight	Absent	
Straight	Absent	raiders as a slave when 12 years now living at Yarkand.

With regard to the nasal index and form, a superior leptorhiny appears conjointly with a far higher percentage of straight and sinuous noses, and a far smaller number which can be described as aquiline. That these differences are due entirely, if at all, to the presence of Indo-Afghan blood, appears unlikely, since this hypothesis fails altogether to account for the increased number of short statures, the smaller number of aquiline noses, and the sudden appearance of broad cheekbones. Any similarity appearing between the Baluchi and Khotanese may be explained by their common ancestor, *Homo Alpinus.* It is more natural to suppose that a Turki element enters more largely into the composition of the Tarim peoples than into that of the Galchas, who are admitted to be fairly pure.

Such an admixture would account for the differences with respect to nasal form, facial index and colour of hair, eyes and lips, while the character of the hair and the cephalic index would not noticeably be altered. The difficulties which remain are the following :—

In the first place it cannot be pretended that the Turki element is large; the Turk is by nature a nomad, and only becomes a settler under compulsion; the occurrence of so many short statures is left unexplained; and certain of the changes, notably that in the nasal form, appear too violent unless a large admixture of Turki peoples is supposed, and this seems improbable.

If, however, to a slight admixture of Turki peoples is added a larger admixture of Tibetans, an accentuation of the characteristics of the former as to face, eyes and hair, occurs, and at the same time the stature is reduced.

It might be thought that the breadth of nostrils mentioned as characteristic of the Tibetan might be against this view; but, as has been mentioned above, the noses of the Khotanese appear to be no narrower than those of the people of Keriya, who show a decided tendency to platyrhiny. The leptorhiny of the former is due to the superior length of nose.

With regard to the people of Keriya; on the whole they seem to show, as might be expected from their neighbouring position, a very strong similarity with the Khotanese, but with a more marked tendency towards short stature, platyrhiny, straight and even concave form of nose, black hair and dark eyes. From their eastward position and consequently greater proximity to the Koko-nor region it seems probable that they have been brought into contact with Mongolian peoples; and a comparison of their measurements, etc., with those of the Ladakhi would seem to support this view. At the same time the characteristic amount of hair and the presence of only one individual with the Mongolian type of eye, shows that Mongolian blood can be present only in diluted form. That this admixture is more recent, and is even now continuing, may be judged from the fact that one individual (No. 20) seems to approach the pure Mongolian type fairly closely.[1]

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[1] One other point is worth mentioning; Grenard (*loc. cit.*, p. 29) remarks in connection with the Wusun, whom he describes as related to the Finns: "*On serait tenté de conclure que le Turkestan oriental a été peuplé, au moins en partie, par une race Finnoise.*" This hypothesis he

The principal facts then with regard to the people of Khotan and Keriya appear to be the following.

Both are, in the main, of so-called "Aryan" stock, the chief factor being Lapouge's *Homo Alpinus.*

There is, however, in each case an admixture of Turki blood and a further admixture of Tibetan. The latter appears to be stronger at Keriya than at Khotan, and at the same time here Mongolian influence begins to make itself felt.

The Pamir valleys, as far as Asia is concerned, seem to be the locality where *Homo Alpinus* appears in his greatest purity; in the Galcha he appears with a slight Turki and Iranian admixture. In the Khotanese the Iranian is replaced by a Tibetan element, and further east, among the inhabitants of Keriya, true Mongolian traits are just beginning to appear.

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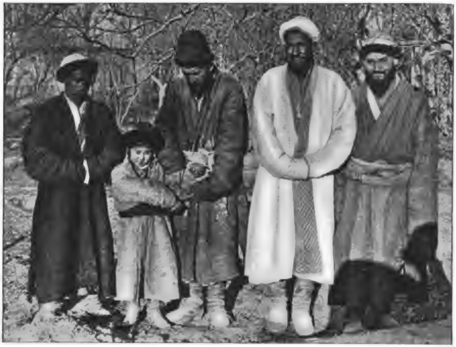
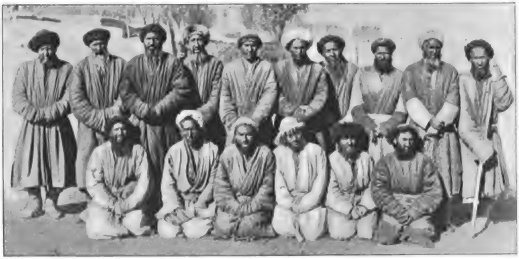
rejects owing to insufficiency of evidence, but certainly there is a great temptation to attribute the short stature and occasional blue eyes of the inhabitants of Khotan and Keriya to some such parentage. That these two characteristics appear in greater force in Keriya would be thus explained, since as we proceed westward the more completely do the traits of *Homo Alpinus* assert themselves at the expense of those of other races. This, however, can be no more than the merest conjecture.



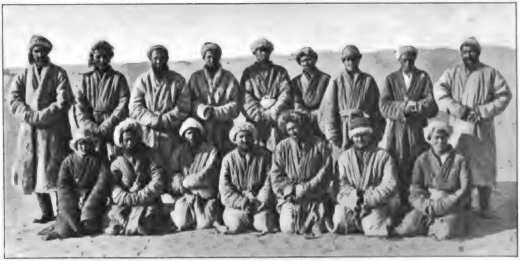
VILLAGERS OF KHOTAN.



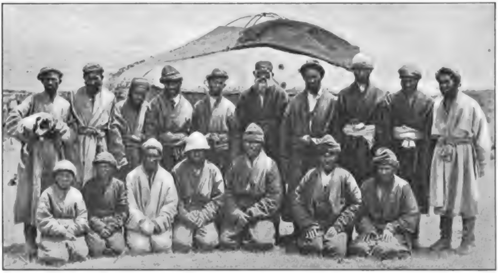
TAGHLIKS AND KHOTANESE EXILES AT KARANGHU-TAGH.

THE PHYSICAL ANTHROPOLOGY OF THE OASES OF KHOTAN AND KERIYA.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, Plate XXVII.



LABOURERS FROM THE OASIS OF TAWAKKEL.
(Tawakkel was colonized in historical times by inhabitants of the Oasis of Khotan.)



WAKHIS AND KIRGHIZ AT DAFDAR.
(The individuals in the front row, with the exception of the central figure, are Kirghiz, the rest Wakhis.)

THE PHYSICAL ANTHROPOLOGY OF THE OASES OF KHOTAN AND KERIYA.

by Google

BRITISH EAST AFRICA.

ANTHROPOLOGICAL STUDIES IN KAVIRONDO AND NANDI.

By C. W. Hobley, Assoc. M. Inst. C.E., and Assistant Deputy Commissioner, E.A. Protectorate.

[With Plates XXVIII-XXX.]

This paper contains the results of a more minute research into the habits and beliefs of the people already dealt with in a previous publication of the Institute.[1] The term Eastern Uganda, as applied to this area, is, however, no longer correct, as since the date of that publication, the Eastern Province of Uganda has been transferred, and is now known as the Kisumu Province of the East Africa Protectorate.

When compiling my former work, I had no idea that such an amount of material still remained to be recorded, and, consequently, I was equally surprised to find that so much more existed; I venture, therefore, to hope that my researches may furnish students of the science, who have no opportunity of visiting these countries, with some information worth their consideration.

The disappointing feature in researches of this nature, to the observer in the field is that no reason is obtainable from the people themselves for the existence of many of their strange customs, but I have no doubt that anthropologists in Europe, with their advantages of a wide range of comparative study, will see daylight where the local observer, with his limited vision, flounders in darkness when he tries to work back and find the origin of some custom, now a mere relic of its former self.

In the collection of the information embodied in this paper, I have been greatly indebted to several intelligent natives who are employed in traversing the country from end to end, superintending the collection of the hut tax, and who, in pursuance of their duty, visit, during the course of the year, practically every village. These men, I found, took a great natural interest in enquiring into any strange rite or ceremony they incidentally met with in the course of their peregrinations. I have also encouraged chiefs and others whom I have met to talk of their beliefs, etc., and, in most cases, their usual reticence to discuss such matters with a European can soon be overcome.

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[1] *Occasional Papers*, No. 1, "Eastern Uganda," by C. W. Hobley.

I must also express my indebtedness to Mr. Mayes, Collector of Nandi, for much information regarding that tribe, which is particularly uncommunicative on these matters.

I have no doubt that, as years go by, many of the matters dealt with herein may become much clearer, but I have thought it best to publish the material without further delay, as it may help to stimulate further research, and I also fear that as civilization develops, many of the strange customs and legends may become lost; in fact, there are already signs that the younger generation of natives are losing interest in the old order of things.

LEGENDS OF THE ORIGIN OF THE JA-LUO RACE.

Many savage tribes have legends or myths to account for their origin, and I believe I am correct in stating that, in Africa, it is generally among those of Bantu origin that such myths are found. However, in the whole of the country in the vicinity of the east side of the Nyanza, with which I am fairly well acquainted, with one exception, no trace of a definite legend has been discovered among the Bantu tribes (the exception being the Kadimu belief that their common ancestor was a huge python). Among the Ja-Luo, however, there is a very wide-spread belief in one Apōdtho, who was the Adam of the comparatively limited area of which these people have any cognizance.

I venture to give three versions of the same myth taken down from three chiefs living some forty miles apart. Each of these authorities also gave me a genealogical tree of considerable interest, inasmuch as they contain what may be a very probable solution of the origin of the names of the Ja-Luo tribes in Kavirondo. Of course there are discrepancies, but when one considers the way this story and the genealogical tables have been handed down verbally from generation to generation, one wonders that the three versions present so many features in common.

Version I from Ugada chief of Usakwa.

Apōdtho was the father of all the Kavirondo people. He descended from the heavens, and the day he reached the earth, the various kinds of animals also came down from above.

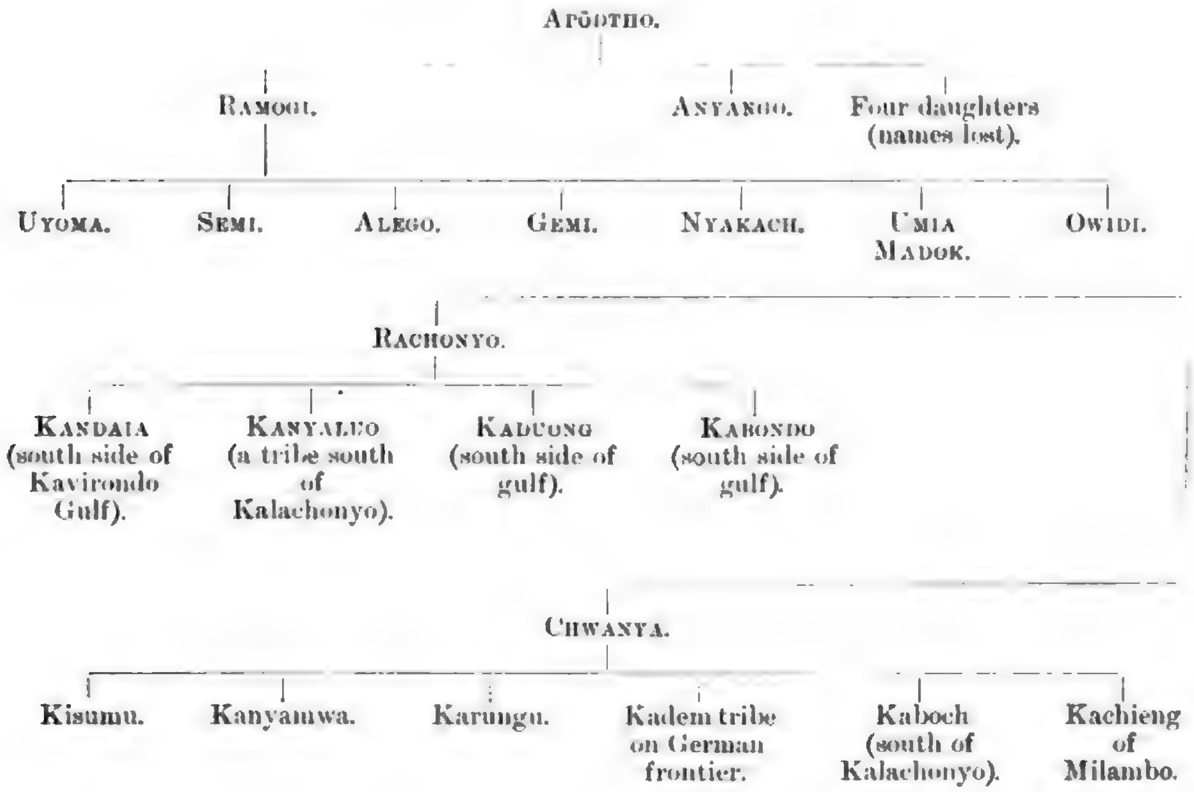
Apōdtho descended on Ramogi, or Lamogi, Hill, a long way north of Uganda, and he afterwards died at the same place. He descended with one woman, whose name is forgotten, and by her he had two sons and four daughters. These sons were named Ramogi and Anyango, and each married two of his sisters.

Ramogi migrated southward, and came and settled on a hill in Kadimu country (near the mouth of the river Nzoia); this hill is called after him to this day. His offspring founded the Ja-Luo race; most of the names of his sons being the names of the various tribes which were founded by them.

Anyango, the other son of Apōdtho, stayed in the country of his father and became the progenitor of the Baganda and Banyoro. On the day that Apōdtho reached the earth, among the other animals that accompanied him were a bull, a cow, and a calf; he also brought *mtama* and other food-bearing seeds and plants, and there is especially mentioned besides, a tree called "Were," and out of the wood of the Were tree he made two wooden bowls. He then milked the cow into one of the wooden bowls, and, from ignorance he caught the cow's urine into the other bowl; this done, he poured the milk into a gourd and left the bowl of cow's urine in the sun, and then rested till the evening. At sundown he churned the milk that was in the gourd, collected the butter, and put it on one side; he then brought in the bowl of urine and mixed it with the buttermilk that remained in the gourd. Then, being hungry, he took the mixture and made some gruel with *mtama* meal, cooked and drank it; after drinking it, he passed urine for the first time since he had reached the earth, and this is the origin of the Ja-Luo custom of mixing milk with the cow's urine which prevails to this day.

GENEALOGY OF JA-LUO.

Version 1 of Ugada Ndiek of Usakwa.


APŌDTHO.
RAMOGI.
ANYANGO.
Four daughters (names lost).
UYOMA.
SEMI.
ALEGO.
GEMI.
NYAKACH.
UMIA MADOK.
OWIDI.
RACHONYO.
KANDAIA (south side of Kavirondo Gulf).
KANYALUO (a tribe south of Kalachonyo).
KADUONG (south side of gulf).
KABONDO (south side of gulf).
CHWANYA.
Kisumu.
Kanyamwa.
Karungu.
Kadem tribe on German frontier.
Kaboch (south of Kalachonyo).
Kachieng of Milambo.

Version II. Ugadu chief of Korando.

Apōdtho was the ancestor of all men; he descended to the earth from above, and brought with him two head of cattle, some fowls, and seeds of *mtama*, *sem-sem*, and *wimbi*. He found the tobacco plant growing on earth; the elephant gave him the sweet potato and beans. He also brought the knowledge of making fire by rubbing two pieces of wood together, and he taught the Ja-Luo to mix cow's urine with the milk.

He reached the earth in the country away to the north of the lake, and died in that country; at his death, he turned into a rock. Apōdtho had supernatural powers and possessed the power to turn into a rock at will. When he was old, the Ja-Luo conspired to kill him, but for a long time nothing came of it, because they were afraid of him; but one day sickness overcame him; the conspirators sent a girl to see if he was really sick, as they thought it would be a good opportunity to kill him. She took a small horn, used for cupping blood, in her hand, and, while talking to him, she placed the cupping horn on his shadow; to her surprise it drew blood from the shadow. She returned and told her friends that, if they wanted to kill Apōdtho, they must not touch his body, but spear his shadow; they did so, and he died and turned into a rock, which the Ja-Luo afterwards considered to possess special virtues for sharpening spears on.

Ramogi was the first member of the Ja-Luo race to come to Kavirondo, and he built in Kadimu country, near what is now the village of the chief Anam.

The Ja-Mwa (or Bantu Kavirondo) are descended from Anyango and came to Kavirondo before the Ja-Luo. They also came from the north, but belong to a different stock, the Baganda and Ba-Soga.

The Nandi came from the Ja-Lango. The Ja-Luo on the south side of Kavirondo Gulf originally lived on the north side, and crossed over by canoes.

The Koloa and various Ja-Luo clans on the Kitoto plain are the descendants of one Kanu, who is said to have come from Masai land, and to have married the sister of Rachonyo and settled down in the Kitoto plain; they are to this day often grouped together under the name Ja-Kanu.

Gemi, Lego, Sakwa, Kadimu, Ugenya, the founders of the tribes of the same name, were not sons of Ramogi, but were collaterally descended from Apōdtho.

Version III.

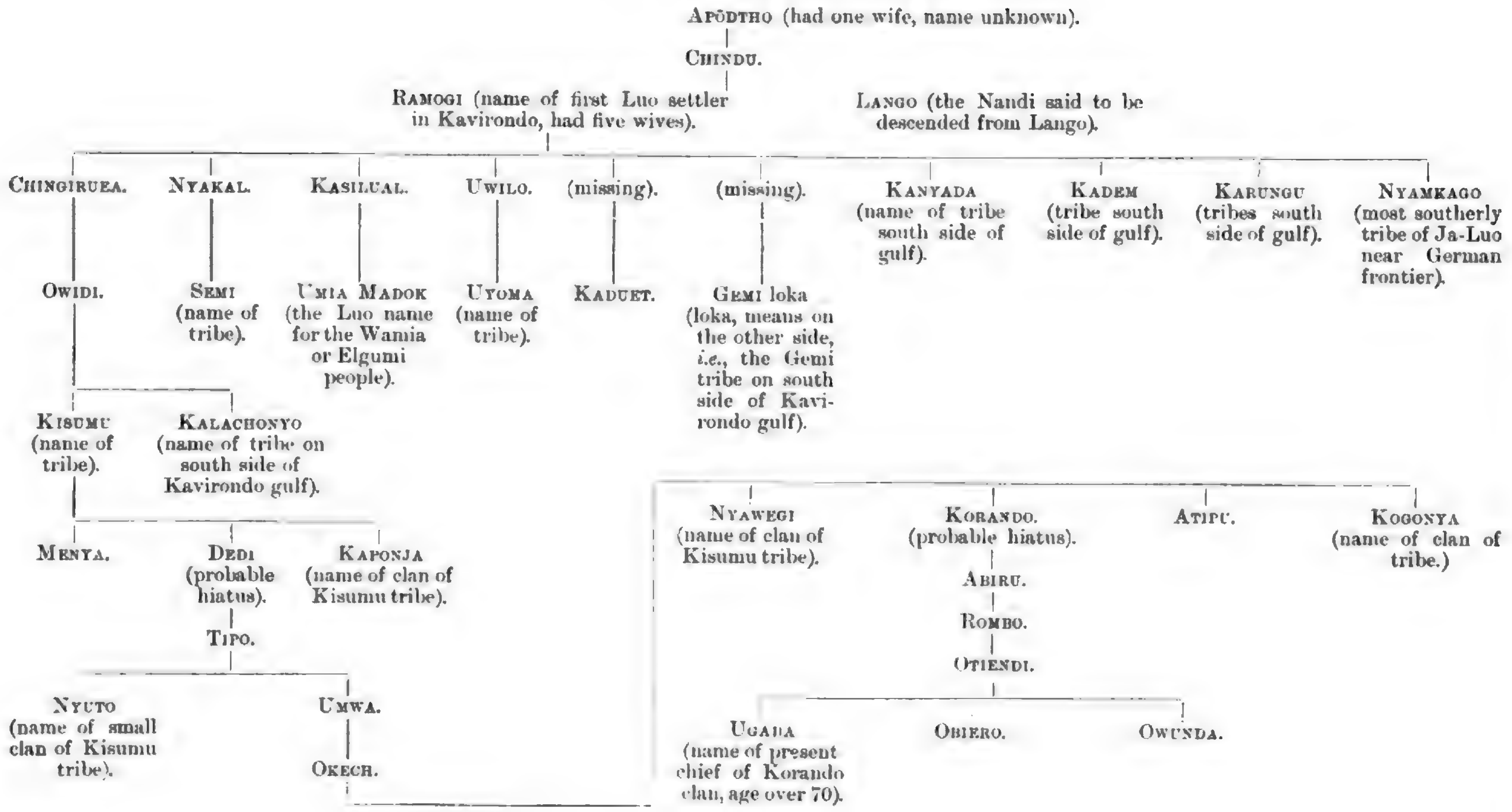
This version was obtained from Gori Kogalo, chief of Kanyamwa (Ja-Luo) on the south side of Kavirondo Gulf.

Apōdtho was the father of all mankind; and he, the sun, the wind, and the moon appeared on earth together; the father of the sun was dead. Apōdtho brought with him to the earth a spear, a shield, and fire. The buffalo and the cattle came out of the sea (probably meaning the Nyanza), and were herded by mankind, but the buffalo broke away, and took to the woods, refusing to become tame as the cattle did; he also brought *mtama* grain, the *wimbi* he found growing on earth in the grass; he found tobacco and the sweet potato growing in elephant dung.

Shortly after their arrival, Apōdtho ordered the moon to kill an ox, but the moon refused; he then told the sun, and then the wind, they also refused, so he killed the ox himself with a blow from his fist, and then ate the meat, offering some to the sun, moon, and wind, but they all refused to eat, and he was very angry, so they fled back to the heavens and have stayed there ever since. Apōdtho told his

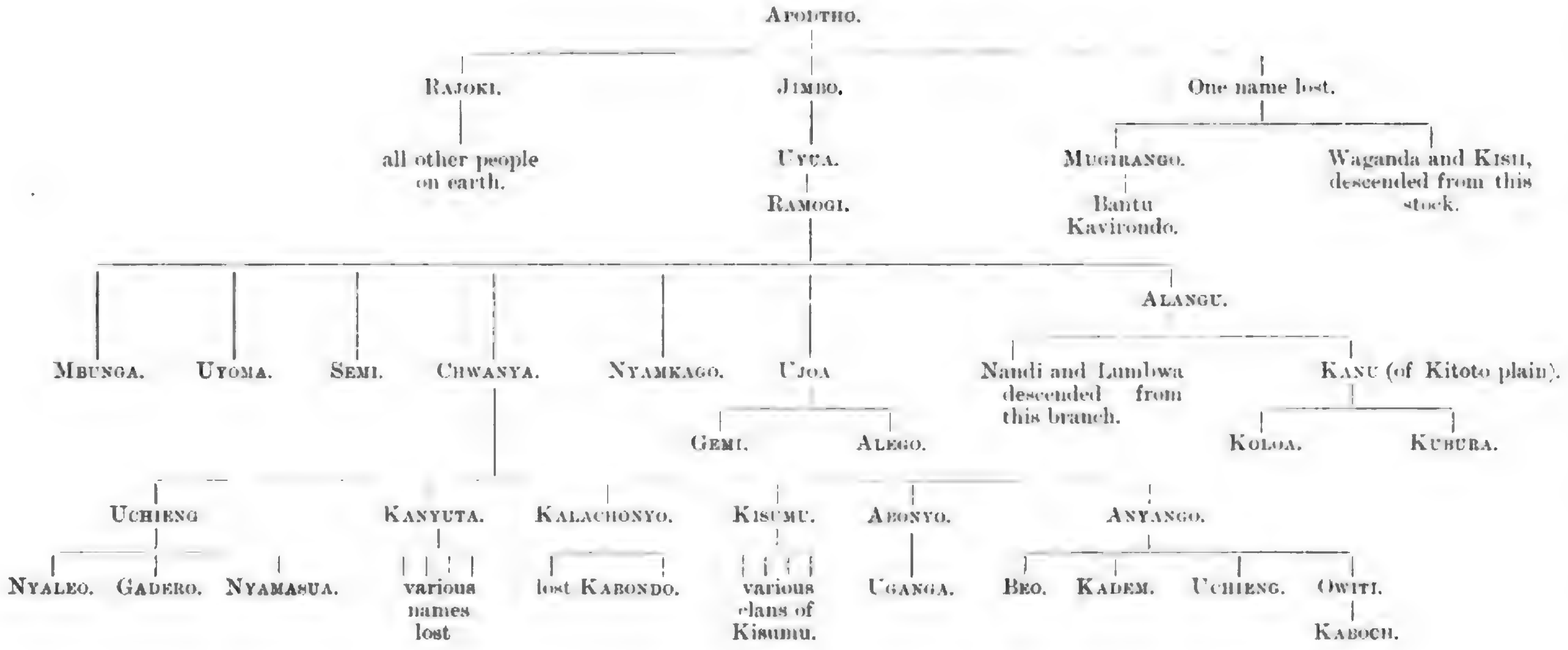
Genealogy of the Ja-Luo.

Version 2 of Ugada Koranda.


Apōdtho (had one wife, name unknown).
Chindu.
Ramogi (name of first Luo settler in Kavirondo, had five wives).
Lango (the Nandi said to be descended from Lango).
Chingiruea.
Nyakal.
Kasilual.
Uwilo.
(missing).
(missing).
Kanyada (name of tribe south side of gulf).
Kadem (tribe south side of gulf).
Karungu (tribes south side of gulf).
Nyamkago (most southerly tribe of Ja-Luo near German frontier).
Owidi.
Semi (name of tribe).
Umia Madok (the Luo name for the Wamia or Elgumi people).
Uyoma (name of tribe).
Kaduet.
Gemi loka (loka, means on the other side, i.e., the Gemi tribe on south side of Kavirondo gulf).
Kisumu (name of tribe).
Kalachonyo (name of tribe on south side of Kavirondo gulf).
Menya.
Dedi (probable hiatus).
Kaponja (name of clan of Kisumu tribe).
Tipo.
Nyuto (name of small clan of Kisumu tribe).
Umwa.
Okech.
Nyawegi (name of clan of Kisumu tribe).
Korando. (probable hiatus).
Atipu.
Kogonya (name of clan of tribe.)
Abiru.
Rombo.
Otiendi.
Ugada (name of present chief of Korando clan, age over 70).
Obiero.
Owunda.

GENEALOGY OF THE JA-LUO.

Version 3 of Gori Kogalo.


APODTHO.
RAJOKI.
all other people on earth.
JIMBO.
UYUA.
RAMOGI.
One name lost.
MUGIRANGO.
Bantu Kavirondo.
Waganda and KISII, descended from this stock.
MBUNGA.
UYOMA.
SEMI.
CHWANYA.
NYAMKAGO.
UJOA
ALANGU.
Nandi and Lumbwa descended from this branch.
KANU (of Kitoto plain).
GEMI.
ALEGO.
KOLOA.
KUBURA.
UCHIENG
KANYUTA.
KALACHONYO.
KISUMU.
ABONYO.
ANYANGO.
NYALEO.
GADERO.
NYAMASUA.
various names lost
lost KABONDO.
various clans of Kisumu.
UGANGA.
BEO.
KADEM.
UCHIENG.
OWITI.
KABOCH.

children that he had left a beautiful country in the heavens where the people were all bright like fire, and that when they were dead, they would all go and meet these people.

Ramogi, the great grandson of Apōdtho, taught the Ja-Luo the custom of mixing cow's urine with the milk.

Mbunga, the eldest son of Ramogi, was the first member of the Ja-Luo to migrate southward into Kavirondo, and his brothers followed him; upon their arrival, they found the Bantu Kavirondo in possession of the land, but gradually drove them back.

The Bantu Kavirondo are descended from one Mugirango.

The Masai are descended from a Ja-Luo youth who, when out one day herding cattle, absconded into the woods, driving off the cattle; a woman who was lazy, and would not cultivate, crept away and joined him, and they became the progenitors of the Masai; they live by eating herbs and drinking milk to this day.

The Nandi and Lumbwa are descended from Alangu, a son of Ramogi.

Rajoki, a son of Apōdtho, is the ancestor of all the other people on earth, Europeans, etc.

This account was given me by an old chief living away in the hills to the south of Kavirondo Gulf, a man who has probably not seen half a dozen Europeans in the whole of his life. He told me that, in his youth, the old chiefs had many more legends, but the young men of to-day took but little interest in such things, and they were all rapidly being forgotten. He confided to me that his neighbours imputed to him the power of being able to transform himself at will into the shape of an ox and other animals, but he gravely assured me that these slanders were quite unfounded, and were a source of great embarrassment to him.

The version of the legend, given above, differs considerably from those previously recounted, and many new names appear. Most of the new names, however, are the names of tribes living in South Kavirondo, or Ugaya as it is often called, *e.g.*, Nyamkago, Kalachonyo, Kabondo, Kaboch, Kadem, Uchieng. As these were near neighbours of his ancestors, their names would be more likely to be remembered.

There is, I think, enough internal evidence to show that this is really a very ancient genealogy, brought down from the Nile valley by the people when they migrated to the south.

An examination of the three versions of the genealogy of the Ja-Luo just given will lay bare many discrepancies, the presence of which, to my mind, gives an air of great genuineness to the information, and is, in a way, proof of the age of the myth.

Like the genealogy of the Uganda kings given in Mr. Roscoe's paper,[1] and, for the matter of that, like many other genealogies of world-wide fame in the ancient history of more civilized countries, we have in the Ja-Luo genealogy a succession of mythical personages and demigods at one end of the line, and at the other end, working back for a certain distance of time, a genealogy of the heads of the family tribe or *gens*, which is linked, quite in good faith, on to the mythical beginnings of the tree. Where the transition from family or tribal history to myth occurs in the present example, it is impossible to state accurately, but after listening carefully to the narrative, I venture to point out where I consider a hiatus occurs.

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[1] *Journ. Anthrop. Inst.*, vol. xxxii, p. 25, "Further Notes on the Manners and Customs of the Baganda," Plates I and II.

In the Uganda genealogy, it will be remembered that the common ancestor of the Baganda was one Kintu; it is rather remarkable that, in one of the present examples, the name of the son of Apŏdtho is given as Chindu, especially as, in African languages, a prefixial K– often becomes changed to Ch–.

If, however, the genealogies now given possess no other interest, they at least afford, it is considered, fairly good evidence as to the way in which the various Nilotic tribes and sub-tribes or clans in Kavirondo derived their names; for there is no doubt that in olden times the chiefs were far more powerful than now, and a vigorous chief with a large number of wives could have descendants enough to form the beginning of quite a considerable clan.

I have no doubt that in the more outlying parts there is an untold wealth of legend and myth of anthropological interest awaiting record, and when the Acholi (Shuli) and Lur countries become more opened up, stories of the causes which led to the great Ja-Luo migration southwards will probably be unearthed, and it may even be that the rock, into which Apŏdtho is said to have become metamorphosed at his death, will be found to be looked upon as a kind of fetish stone to this day.

I do not consider that we shall get much further with regard to unravelling the mystery of the various great migrations by research anywhere south of Mount Elgon. As an instance of this: for a long time past, I have, at intervals, made endeavours to find out from the Nandi people, some trace of a legend about their arrival in the country, without success; but a few months ago, when travelling in the vicinity of Elgon, I was talking to some members of the Lako tribe (a branch of the Nandi group who live on the mountain), and I was very much interested to find that they had a legend, relative to their migration, to the effect that they had originally lived on a mountain called Kamalinga, some forty-five miles to the north-west of Elgon, and that the Nandi lived on the east side of that mountain, and the Lako on the west, and from there they migrated south-east, the Lako and their close relatives the Savei people settling on Elgon, and the Nandi pushing onward through to the Guasangishu plateau. Of course they really came from much further north, but this seems to be a link in the chain, and probably if the Kamalinga region were visited, further evidence would be obtained.

The Lako too had a curious legend to the effect that, in past times, a stream of fire ran down the mountain (Elgon) and burnt up the forests it encountered on its way, which looks as if the mountain had been active in historic times, for the natives could not possibly know that Elgon is an extinct volcano.

GENEALOGY OF THE AWA-WANGA.

An enquiry into the past history of the Awa-Wanga, the leading Bantu tribe in Kavirondo, of whose origin I gave a provisional sketch in *Eastern Uganda*, p. 43, failed to reveal any trace of a belief in a common ancestor who descended from heaven among these people, but in the course of my investigations, I was able to compile, from various sources, an abstract of their history for, say, the last 300 years or so.

The Awa-Wanga originally came from what is now Tsoso country, and the chief Wanga, from whom the tribe takes its name, was descended from one Kuau. Wanga and another chief named Wakabiakala, a Tiriki chief, were neighbours, and lived near where Wombunya's village now is, close to the source of the River Viratsi. The head wife of Wakabiakala stole bananas from Wanga's plantations, who, finding his bananas disappearing, lay in wait for the thief, and was very surprised when he discovered who it was; her chagrin at being found out was so great that she hanged herself. This made trouble between Wanga and Wakabiakala, and the latter used very insulting language to Wanga and accused him of being the cause of his wife's death. Wanga, who appears to have possessed a very sensitive disposition, took all this to heart, and decided to go away secretly.

He did so, and came to the village of Manga (a hill about four miles south of Mumias Station), where Muima, the chief of the Awa-Manga, lived; he posed as a poor wanderer with a maimed arm, which he carefully kept under his skin cloak; he did this because on his right arm he wore a massive brass bracelet, his insignia of chieftainship. He was received in a friendly manner, and he set himself to work to sweep out the cattle kraal with one hand, and they gave him his food and a hut to sleep in. But Muima's wife was very anxious to know what was the matter with his maimed hand, so she bored a hole through the wall of his hut; peering through this, she espied him washing both hands and noticed the brass armlet. She at once ran off to her husband, and told him that the visitor must be a chief. He pooh-poohed the idea, but she promised to prove her statement, and early next morning took some porridge and water to Wanga's hut, and then brought her husband to the back of the hut, and made him peep through the hole she had bored, when he saw Wanga eating, using both hands, and also saw the armlet. When Wanga came out, Muima taxed him with his curious behaviour, and insisted on knowing who he was. Wanga told his story, and Muima agreed to allow him to remain, and sacrificing a goat, put a strip of the skin on each of their wrists, which is a sign of friendship.

About a week after, a number of Wanga's people, who had been searching for their chief, arrived at the village and besought him to return, but he refused, and Muima gave Wanga an ox to make a feast for his people. Many of Wanga's people followed their chief, and he built a big village, called Shikulu, near the River Lusimo, where he died. This is how the Awa-Wanga became established in the vicinity of Mumias. The country around Mumias was all wooded in those days, and abounded with game which the people used to hunt, and, I suppose, gradually exterminated.

After Wanga, came several chiefs of whom but little is known, and then came a big chief named Netia. Netia's principal brother was named Kiteji, and the two brothers had a serious quarrel, being jealous of one another, and Netia drove his brother out of the Wanga settlement; Kiteji crossed the River Lusimo, and commenced to build at Rekho, a village in a banana grove, about half a mile west of Mumias Station. Netia heard of this, followed him, and warned him not to build so near; but, unfortunately, that very day the Wa-Kwavi (Masai) came in from the east on a raid, and slew nearly all of Kiteji's warriors, surprising them as they were scattered about in the woods, cutting poles wherewith to build their new village. Now most of the Kiteji's men being killed, Netia at once saw that there was no longer any need to be afraid of his brother and look upon him as a rival, so he seized this opportunity to make friends with him, and give him a site for his village near Rekho, he himself settling on that site, and after this they lived peacefully as neighbours.

Later on, Netia made peace with the Wa-Kwavi, and they used to come to his village to drink beer; but he could not tolerate their filthy habits, and complained of their micturating in his hut during a beer drinking. One day he was so annoyed that he took out twenty, and strangled them all. This incident greatly incensed the Wa-Kwavi, and they promptly declared war. An impi arrived to attack his village, and when he saw them all drawn up for the attack, he took ten picked men, charged down upon the enemy, and he and his men were soon all speared.

Netia being dead, the Wa-Kwavi then agreed that his son Sundwa should reign in his stead, and hostilities ceased. Sundwa was a very good chief, and kept peace with all the surrounding tribes; he obtained great influence over them, even over the Wa-Kwavi, and they listened to his judgments. He had one hundred sons, but he would not see any of them, and issued a decree that they were all to keep out of his sight. It is said that the reason of this was that he was afraid that one of them would make a conspiracy with one of his wives to kill him. (It is possible that this may be a recrudescence of the common belief in the many myths relating to the murder of parents by their children.)

Sundwa was an immense man, and late in life he was so stout that he was unable to walk, and had to be carried in and out of his house. His appearance was very fierce, and his eyes were as red as blood. His eldest son was Kwehu, and they had a quarrel because Kwehu had looted about one hundred head of cattle from a neighbour named Vitonja, and refused to return them. Sundwa sent for Vitonja, and told him to bring cattle ropes equivalent to the number of cattle he had lost. Vitonja did so, and Sundwa out of his own herds gave him cattle equivalent to those raided. Kwehu left the family settlement, and built the village of Lumino about three-quarters of a mile south of Mumias Station, which was lately used by us as a transport depôt. After this incident, Sundwa would not have any dealings with Kwehu, and appointed another son named Mkoya to succeed him, and eventually died.

When his father was dead, Kwehu made an attempt to crush Mkoya, but he was defeated and went to live at the village called Kimuri, about one and a half miles east of Mumias Station, on the road to Kabras.

After some years of desultory fighting, Kwehu made overtures to Mkoya and invited him to his village to make peace; Mkoya went, and Kwehu made a big feast. It is said that he put poison in Mkoya's food, for he returned home and died five days after, and his son Sundu reigned in his stead. Kwehu then sent word to Sundu and said:—"Your father is dead and I am his eldest brother. Collect his cattle and riches, and bring them to me," but Sundu replied, "If I came, I should expect to share the fate of my father and die at your hands. Therefore I will not come, but declare myself chief of the Wanga."[1]

Many people left Kwehu to follow Sundu, and he became a great chief; and thus it was that the Wanga tribe became divided into two halves.

At one time the Kabras, Ketosh, and Kusia tribes made a great coalition to break the power of Kwehu, because they feared his ambitious nature and were afraid that he would eventually crush them one by one. A great war party assembled to attack his principal village Kimuri, and when Kwehu saw the army approaching, he went into one of his huts and brought out sheaf upon sheaf of arrows, more than could be counted, which he had been quietly collecting and having made for years past in anticipation of a big fight. The enemy attempted to storm the village, but the arrows of Kwehu's men rained so thickly that they could not withstand them, and broke. Sundu hearing of the great fight, collected his men, sallied forth to help Kwehu, and completed the defeat; for he argued that if Kwehu was defeated, the enemy would then march on to attack him. A chief named Wakholo of Kagenyi, a tribe down the river Nzoia, west of Mumias, came to assist Kwehu, and they slew many of the Kabras-Ketosh allies. The fighting went on, at intervals, for some years, and there can be seen at Kimuri to this day a rock with a hollow in it which was made by the beating of his fist; it was his custom to sit and beat this stone with his fist to give emphasis to his judgments or orders. He had a tremendous voice, and could make himself heard from Kimuri to Rekho (Sundu's village: a distance of over two miles).

There was a terrible famine in Kwehu's time; but he had laid in enormous stores of grain, having sent round far and wide before the famine to say that he wished to buy grain, to pay for which he frequently would slaughter as many as one hundred oxen in one day and buy grain with the meat. When the famine came, he would not allow his people to kill their cattle for food, but invited them in turn to his village, and fed them till the time of scarcity was past. He ate alone in his house, and it was the duty of one of his wives to keep watch at the door; he fed with both hands, and any that fell he let lie, and after the meal, the fragments would be as much as two boys could carry away. If the woman who was on guard allowed anyone to enter and see him eat, he would kill her with a club. He was an enormous man, much bigger than any other man in the country. He and his father Sundwa were of a size. He died of extreme old age. Sundu was chief when Joseph Thomson visited Kavirondo in 1884.

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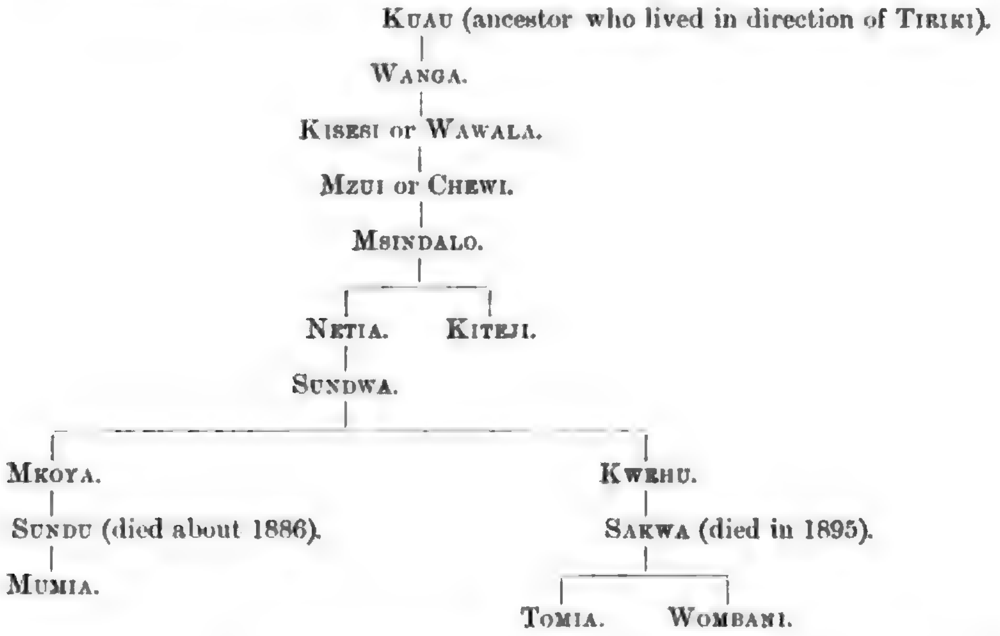
[1] By local law and custom, if a man dies, the eldest brother is heir to the wives and most of the property of the deceased.

GENEALOGY OF THE CHIEFS OF THE AWA-WANGA.



We have here a matter of fact account of the history of one of the sections of the Bantu race which stretches back probably to between 200 and 300 years; this account, which we may reasonably believe to be fairly accurate, does not contain any allusion to the southern invasion of the Nilotic race, so we may perhaps venture to assume that that incursion occurred previous to the date at which this record commences. There is one curious point worthy of notice, namely, that in Wanga's time the brass bracelet was evidently the recognized and wide-spread symbol of chieftainship, and thus may be taken as dating back some distance before Wanga's time; one is at once prompted to inquire whence these brass bracelets can have come, especially as the metals forming the alloy are not known to occur anywhere in this region, and as the Arab traders only reached the lake region some sixty years ago. In Uganda too, it is said that brass and copper ornaments and weapons were in ancient times a monopoly of royalty, and, even up to quite recently, copper spears were considered part of the royal insignia. Where this brass and copper was originally derived from is unfortunately a mystery. Communication with the east coast only commenced comparatively recently, so that eliminates one source. It is possible that these metals may have been brought up the Nile valley from Egypt, or into Uganda by the ancient Hamitic invaders, and, in course of time, found their way across the lake; or they may have worked northwards from Katanga, where considerable deposits of copper are to be found.

FOLKLORE AMONG THE AMA-WANGA.

Their love of animal folklore is a well-known characteristic of the Bantu race throughout Africa from Zululand to Uganda, but the following examples, collected from the Awa-Wanga of Mumias, are, I believe, the first ones recorded from Kavirondo. They are simpler and shorter than similar stories from Uganda. The general type of story is usually the meeting of a savage animal with a harmless one, and the eventual triumph of the harmless animal by some simple trick. These stories are told in the evening, when the members of the village congregate and gossip after their meal is finished; one will start and tell a story, and then another will tell one, and so one; they try to outvie one another by striving to see who can recount the greatest number; the children sit round, and, as the same stories are heard over and over again on different occasions, they become firmly imprinted on their memories, and are thus perpetuated from generation to generation.

As far as I can discover, neither the Nilotic Ja-Luo nor the Nandi people possess any such lore.

The Fable of the Leopard and Hyæna.

The leopard and the hyæna met over a kill belonging to the leopard, and the leopard reviled the hyæna and said, "I kill meat and you come and try to eat it"; and the leopard gave the hyæna a kick. This made the hyæna angry and he snapped at the leopard's leg and bit it off, and the leopard died from the effects of the bite. But before he died, he gathered his children together and said unto them, "Beware of the hyæna, and when you kill an animal, take the meat up into a tree where the hyæna cannot get it."[1] This is the custom of the leopard to this day.

The young leopards remembered the words of their father, and some time after one of them was eating some meat up in a tree and the hyæna came by and waited at the foot of the tree. The young leopard was much afraid; so he bit off a small bone and dropped it to the hyæna, who snapped it up, and he said, "You killed my father, and now you come here and want to take my meat and kill me, but I will give you only bones"; and he thereupon threw down a big bone, the hyæna snatched at it and ran off a short distance, and as the hyæna was worrying the bone, the leopard quickly slipped down the tree, gave a big jump, and made off into the bush.

The Story of the Rat and the Cat.

A cat found a rat in a river, and it was like to drown, and the rat called out, "Pick me out of the water or I shall die," and the cat said, "Very well, what will you give me?" and the rat replied, "I have nothing to give you, but when I am out of the water, you can eat me as your recompense." The cat agreed, and helped him out of the water, and then said, "Well, now what about the bargain?" and the rat looked round, and espying a little hole between two rocks, he replied, "Wait a little till I am dry; I do not want to be eaten while I am still wet." And the unsuspecting cat agreed, and gave him time for his coat to dry. Then, waiting his opportunity, the rat made for the hole and slipped into it. The cat was exceeding wroth, and shouted down the hole, "You have cheated me this time, but if I meet you again, I will catch you and eat you." And this is the reason why the cat is the great enemy of the rat to this day, and is always hunting it.

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[1] The leopard has a habit of placing its kill high up in the fork of a tree.

The Story of the Man and the Foolish Woman.

The man said, "Go and cut the *wimbi* (eleusine grain) which is in a certain field," and the woman refused, and said, "It is not worth while cutting it, it is so short and bad," and went off to another field where the *wimbi* was good, and came back and stored it in the village. Nevertheless, while she was away, the man went secretly and cut the inferior *wimbi* and stored it in a hidden granary. After a time a famine came into the land, and all the woman's store of good grain was finished, and she became very hungry, and cried out to the man for food. He took her away with him to the place where his hidden granary was, and told her she must do as he ordered; he thereupon fastened a big stone to each of her legs with strips of goat-skin, and then said, "Climb up into that granary, the stones are 'medicine'"; and the woman climbed up into the granary with great trouble, for the weight of the stones and the hide ropes hurt her legs very greatly, but she eventually accomplished the task and got the *wimbi*. When she had got the grain she was very angry with the man, and said, "What foolishness is this plan of yours to make me hurt myself like this?" And he said, "When I told you to cut the poor grain, you refused, and laughed me to scorn, but now you are hungry, and have had much trouble to reach it, you are glad of it, and will in future remember my words, and will not again despise the grain, even if it is not of the best."

The Story of the Buffalo and the Lion.

A lion, out hunting one day, chanced to find a buffalo, which he pursued, and sprung on to its back and seized it. The buffalo then said to the lion, "You have caught me, but wait a moment, I will not struggle, but lie down and die quietly." At the same time as he said this, he had his eye on a tree close by, which had fallen over and left a space under its trunk. The lion was still hanging on to his back, and he moved on quietly until he and the lion were under the tree-trunk, and then he raised himself with all his might, and crushed the lion to death between his back and the tree. Thus was the lion outwitted by the buffalo.

The Story of the Kite and the Mole.

The kite was poised in the air over some young moles who were playing about, and was on the point of swooping down to seize one, but their mother, happening to come out, saw the danger, and cried out, "Stay, I will give you one of my young ones, but let me pick the one I am least fond of." The kite paused, and just at that moment, the mole picked up some earth and threw it into the kite's eyes, and before he had cleared the earth out of his eyes, the moles had all burrowed under ground and disappeared.

The Story of the Guinea Fowl and the Domestic Chicken.

The chicken and the guinea fowl were related to one another, and both were domesticated animals, but the guinea fowl preferred the bush. One day they met and the fowl said, "Come back with me and live in the village. It is better than living in the bush"; but the guinea fowl said, "No, I will not go and live in the village, for I have often seen men catch and kill fowls; it is a bad place, and I will never go near a village again, but live in the woods, and if you are wise, you will come with me," but the fowl could not make up her mind to leave, so made excuses and went back to the village.

The Ant-bear (Aard Vaark) *and the Hyæna.*

The ant-bear was digging a hole one night, when the hyæna came along. He had never seen an ant-bear before, and he tried to seize it; but the ant-bear turned over very quickly on to its back, and scratched the hyæna so severely with its long claws that the hyæna died there from his wounds. And even to this day a hyæna never attacks an ant-bear.

The Fight of the Hippopotamus and the Elephant.

Many years ago, in the time of the chief Kwehu, an elephant chanced to find a hippopotamus at a salt lick close to the River Nzoia, some little distance below where Mumias Station now stands. The two animals fell out, and the elephant slapped the hippopotamus with his trunk. Thereupon the hippopotamus got angry and bit the elephant in the leg and the two beasts then fought; but the elephant eventually drove its tusks through the hippopotamus. Both the animals were found dead next morning, and the place is called Chikonesi to this day.

GHOSTS.

The Bantu Ithako people in Kavirondo have a curious belief in ghosts. It occasionally happens that a man or woman who dies troubles the surviving relations after death. A near relation of the deceased, the wife or husband or sister, as the case may be, dreams of the departed night after night, for some weeks after death, wakes up in terror, goes and looks out of the hut, and finds the ghost of the deceased sitting near the door of the hut; or it often happens that the ghost is seen sitting on the children's playing-ground close to the village where the deceased was wont to play when a child. The ghosts are always much bigger than life-size.

It is then necessary to take measures at once to put a stop to these sleep-disturbing visits, and the grave is opened by one of the near relations of the deceased, generally a brother, and the corpse in such a case is invariably found to be quite undecomposed and white. It is then taken up and burnt, and the ashes carefully reinterred. This procedure lays the ghost.

The person, however, who has cremated the corpse has, after this, an inevitable malign influence over the children of the deceased, and if one of the children, out of ignorance or by mischance, eats with the person who carried out the cremation, it will die before nightfall, unless a medicine man is at hand to quickly administer a potion to counteract the malignant influence. Certain medicine men can, however, render a child immune to this risk, but it is said to be a matter of great difficulty. Part of the formula consists in killing a sheep and rubbing the child all over the body with the fresh fat.

Among the Awa-wanga, if a man comes to steal cattle at night and is killed during the attempt, next day they build a pile of firewood and cremate the corpse. Otherwise, his ghost or spirit will trouble the village and bring sickness to it.

These two customs indicate quite a highly developed belief in spirits, in some aspects almost European. The cremation of the corpse and the consequent extinction of the spirit, appeared to me as quite a startling revelation of their ideas of psychology.

Again, among the Bantu Kavirondo round Mumias, if a child dies and the mother does not bear again, the bones of the infant are dug up, wrapped in banana leaves, and thrown into the bush; it would appear that the spirit of the child is believed to be exercising a baneful influence on the mother and the digging up of the bones is thought to extinguish the spirit. Probably it is considered that, in the case of a child, such a drastic measure as cremation is not necessary.

Another example of the somewhat high development of the belief in spirits among the Bantu Kavirondo occurs at Nyala, which is on the lake shore near the mouth of the River Nzoia. Rising from the lake, a few miles from the Nyala shore, is a small precipitous granite island called Sumba, and if a European suggests a visit, excuses of various kinds immediately crop up: the canoes are found to be out of repair, the canoe men are afraid to go, and so on; the reason for this being that it is believed that this island is the stronghold of a race of dwarfish elves, which they hold in great awe, and which, if beheld, kill the beholder. They are afraid that if they took a traveller there he might do something—perhaps fire a gun—to irritate these powerful little beings, and cause them to vent their wrath on the unfortunate canoe-men who had conveyed him thither.

These elves are called "sumba," and are invisible to the ordinary mortal, unless they choose otherwise and reveal themselves; for, occasionally, a Nyala native has been known, with great temerity, to boast that he disbelieves their existence, and declare that he will go to the island and invoke them to appear. He does so, and it sometimes happens that they do reveal themselves to him, and he is privileged to eat and drink with them; but before returning, he is solemnly warned that his life will only be spared upon the condition that he observes absolute secrecy with regard to the occurrence; he of course promises, but after a few years he will one day, probably while drinking beer with his fellows, forget his oath, and brag about his visit. From that moment he is doomed, and the morning finds him a corpse.

The *sumba* are evidently looked upon as rather malicious in their influence, for the natives are very careful to propitiate them by offerings, if any untoward circumstances happens; for instance, when the fishing fails, the chiefs send a present of cattle to the island. And from time to time, the people take cooking pots and tobacco pipes, and leave them for their use. If a man has ill luck with his children and several die, he takes a present of goats to the island and some native beer. Not less than a couple of goats should be taken; one is sacrificed upon arriving, and one is left there. There are said to be about fifteen people living on the island. It is perhaps assuming too much to call them the priests of the *sumba*, but, in a measure, they may be considered as such, for although they deny that they have ever seen the elves, yet they are supposed to have an intimate knowledge of the cult, and it is their duty to herd the goats, etc., which are brought as offerings. The island being quite small, any cattle which have been brought as offertories to the *sumba* are transferred to the mainland and herded with the cattle of the tribesmen; but they are all known, and never sold or killed. Even if a neighbouring tribe made war, these cattle would never be carried off as booty, but would be regarded as sacred.

Although there are scores of islands up and down the east coast of the lake, no other instance of this fairy worship has been met with; but the people of Lusinga Island have rather a curious legend, which is worthy of record. To the north-west of Lusinga there is a curious rock which was discovered in 1877 by Stanley, and called Bridge Island. It consists of two granite monoliths, joined at the top, with a space underneath through which a canoe could pass, but for the presence of a rocky bar which blocks the passage.

In Lusinga there are two clans, the *Wa-Nyama* and the *Wa-Ware*, and the story goes that once a upon a time, a bull from the herd of each clan met, and had battle royal; they fought and fought until they were both driven into the lake, where they were suddenly transformed into two rocks, which are the two halves of Bridge Island, and the island is to this day called *Wa-Nyama kwa Wa-Ware*, Once a year, the representatives of the two clans put forth in canoes on a certain day, and each party kills an ox on their own half of the island, eats the meat, and drinks beer there, and then returns home.

OMENS.[1]

Among the Awa-Wanga sneezing is supposed to be a bad omen, and if a man sneezes when about to start on a journey, he puts it off for that day.

If a person plans to visit a friend who is said to be sick unto death, and if a sneezing fit comes on before he starts, then he knows that his friend will certainly recover from his illness.

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[1] For a number of examples of omens among the two Kavirondo and the Nandi races, see "Eastern Uganda," pp. 22, 33, and 41.

The prejudice against sneezing also appears to crop up among the Kwavi or Guasangishu people, and it is said that in the old days, if when they were out on a foray for cattle, an *elmoran* (warrior) who sneezed *en route* was not speared, he was looked upon as a kind of Jonah, who would bring ill luck to the raid.

Although the Nandi love their cattle more than anything on earth, yet there are cases when their dread of the malignant supernatural overpowers this affection; for instance, if one of their cattle is noticed to protrude its tongue to an excessive distance, or if a cow, as it is driven along, gets its tail twisted round a sapling by the road side, they are killed, for both of these incidents are believed to be portents of great impending evil which can only be averted by the death of the animal.

Ancestor Worship.

In Southern Ketosh, about twelve miles north-east of Mumias Station, there is a remarkably shaped hill called Sangaro, which stands out several hundred feet above the surrounding country; its general outline is conical, but it is surmounted by two enormous natural monoliths of granite, of rectagonal shape, standing parallel to each other, with a space of a few feet between the two. This hill is a sacred place with the Ketosh people, and they resort there from time to time and sacrifice fowls, goats, &c. They will tell you it is the place of the *Masambwa* or *Muzimo.*

Now in every Ketosh village, it will be noticed that on a spot in front of the hut of the owner of the village there are four stones planted in the form of a square (the square is about three feet across, and the stones do not usually protrude from the ground more than eight or nine inches), and in the centre of the square is planted a small tree of the wild fig family known to the Swahilis as *mlendege* or (in Kavirondo) *Mrumba*, because the birds devour the fruit with great avidity. This constitutes a kind of village altar, and if any animal is slaughtered in the village, a little of the blood is sprinkled on the stones. The stones are all supposed to have been brought originally by ancestors of the present owners from Sangaro Hill. When a village is moved, the head of the village moves his altar stones to the new site, and plants a fresh tree amongst them; and in the many deserted villages the position of the chief's house can generally be identified by the wild fig tree.

Among the Awa-wanga, the same custom holds, but three stones constitute the altar and the tree is always what is called an *Mtarawanda* or *Siala*, a fine tree, probably one of the Bignonia family, with a large yellow flower, the foliage of which closely resembles the ash. These stones have been handed down from father to son for so many generations that no legend is extant as to their origin.

As an example of the importance which they attach to their possession, it is said that it sometimes happens that a Mu-Wanga has stolen a cow from a native of Marama or Kisa, and if the owner could not induce the chief of the Awa-wanga to make the thief return the cow, he would go by night and carry off one of the *Muzimo* stones from the chief's village and hide it away; great excitement would then ensue and stupendous efforts would be made to recover the cow, which rarely failed to be returned to the owner before nightfall in order to redeem the sacred stone.

The Ja-Luo do not erect altars to the spirits of their ancestors like the Bantu Kavirondo, but for all that they believe in the influence of the spirits of the departed. If a man is stricken by illness, he will make a feast at the door of his hut, and he will take small pieces of meat and throw one to each of the four quarters of the compass; he will then fill his mouth with native beer and squirt a mouthful out on the ground in different directions and finally in a similar way toss out spoonfuls of *mtama* porridge in various directions as propitiatory offerings, at the same time imploring the spirits to take the food and not to worry him.

CHARMS.

Charms are legion among all the Kavirondo, and like other native races (and European, too, for the matter of that), they make no attempt to explain why such and such a charm should produce a certain effect.

The Awa-Tsoso tie a feather from a white chicken on the end of a stick as a charm to keep off hail; the sticks, which are about four feet long, are planted at intervals in the fields of beans and sem-sem; some seem to pin their faith to a wisp of grass which is tied to the stick and placed among the growing crops in the same way. This was only noticed among the Eastern Tsoso people of the Koweri clan, but is probably wide spread.

The Tiriki people suspend a ball of clay by a string which is fastened to a stick, and plant one of these in a field of sweet potatoes or ground nuts to prevent thieving; the ball of clay has one of the yellow fruit of the common wild *Solanum* stuck into it.

The use of this combination of the fruit of the Solanum and clay, as a charm for good, seems to be rather widespread, for at the close of the Nandi campaign of 1900 when the chiefs were making overtures for peace, they brought to the Government station a native stool on which was a conical mass of moist red clay which rather reminded one of a child's mud pie; this was studded all over with the yellow Solanum fruit, and was said to be great peace medicine.

In some parts of Bantu Kavirondo, an old earthenware cooking pot will often be seen fixed as a finial on the point of one of the natives conical huts. This is a charm to prevent the children becoming cross eyed, for it is said children, when quite babies, are often stricken with a disease of the eyes which leaves a chronic squint; the charm does not render them immune to the disease, but averts the after effects; this belief occurs among many tribes in Bantu Africa, and the same charm is used.

Among charms we may perhaps mention that curious tree the *Ekirikiti* or, as it is called in Kavirondo, the *Murembe* tree (*Erythrina tomentosa*) which is remarkable both for its brilliant red flowers, and from the fact that it bears its leaves and flowers at different seasons.

The word *Murembe* in Lu-Wanga means peace, and when peace is made between two tribes, the ceremony, if possible, always takes place at the foot of one of these trees, as the tree is a great peace charm, and the dog, which is slaughtered as part of the ceremony, is generally tied by its neck to the tree.

Among the Awa-wanga, if a man kills a python, it is believed that the snake will return, or possibly that its spirit will return and afflict his children with blindness. Prompt measures must, therefore, be taken to avert this disaster, and he accordingly measures the length of the reptile, and not later than the day following, hoes a path through the grass near his village equal in length to that of the snake, kills a white fowl, then sprinkles its blood in the clearing and also pours a little *mtama* or *wimbi* gruel there too; this acts as a charm to render the python's malignancy futile. Even if a python is seen only, it is considered safe to go through this ceremony. The next child that is borne to the man after killing a python is called *wanawaka* if it is a boy and *newaka* if it is a girl; (*waka* is the Lu-Wanga word for python).

A most extraordinary custom, which holds among the Awa-wanga and may be mentioned under the present heading, is that if a young girl, a virgin, dies, her female relatives, whose duty it is to bury her, artificially deflower the body before burial; this is always done by the forcible insertion of the pointed bulb of spathes which cover the immature flowers at the lower end of a growing bunch of bananas. If this is omitted, it is believed that the sisters of the deceased will not be found to be virgins on their marriage; this would be considered somewhat of a disgrace.

It will be remembered that in Mr. Roscoe's account of the Baganda customs,[1] the flower of the plantain or banana plays a certain part in the ritual which is gone through upon the birth of twins, and is there, I believe, used as a symbol of fruitfulness or plenty; possibly a similar idea may, in the past, have had some connection with its employment in the instance now described.

There are two curious customs, in which the thorn of the acacia plays a part, which may, perhaps, be mentioned under the heading of charms. Among the Ja-Luo when a person dies, for days, perhaps months after, the whole village wails with great fervour, and at stated intervals according to the conventions laid down for the case. If, however, a barren woman dies, the people of the village at once commence to wail in the usual way, and the brothers and sisters of the deceased proceed as quickly as possible to the village where the death occurred. The first blood-relation of the deceased who arrives on the scene takes a sharp acacia thorn, sticks it into the sole of the foot of the corpse and breaks it off; immediately this is done all wailing ceases at once, nor is it renewed as in the case of an ordinary death. The origin and the object of this strange custom appears to have been entirely lost.

Among the Nandi, when a raiding party is being arranged, the *elmoran* (warriors) proceed to a *laibon*, or medicine man, an ox is killed and the *laibon*, from an examination of the entrails, delivers an augury on the success or otherwise of the expedition. Among his utterances he may remark that some will be wounded with arrows, and, upon hearing this, each *moran* proceeds to the nearest acacia tree and plucks a green thorn, and if he is possessor of a shield, he sticks the thorn in the wooden midrib of his shield and breaks it off, leaving the point of the thorn in the shield, and carries it into action with him; if he has no shield, he breaks off the thorn in the hair on his forehead; this is believed to be a most potent charm against arrow wounds.

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[1] *Journ. Anthrop. Inst.*, vol. xxxii, p. 25, *et seq.*

Among the Nandi too, there is a curious custom which is performed by a married woman, when she discovers she is first pregnant.

She collects from the unmarried girls, who are her near neighbours, pieces of their dress, strings them together and sews them on to the lower edge of her own robe, which is a semi-tanned ox-hide. The unmarried girls in Nandi wear a small skin apron from which depends a number of leather strips or tassels; from one, the woman will borrow a single tassel, from another, a tassel, and perhaps from another girl, who has more than one dress, she will borrow the apron complete. She wears these until after the child is born as a charm to ensure her pregnancy taking its normal course, and then returns the borrowed articles, at the same time inviting all the lenders to a feast.

A sprig of a certain herb is often worn by the Nandi in a hole pierced in the upper lobe of the ear as a charm to avert evil.

The Ja-Luo, in fact all the Kavirondo people, wear numerous small charms suspended by string round the neck. I had often wondered what all these odds and ends represented, so I induced one of the principal chiefs, named Ugada, in a confidential moment to enumerate them and tell me their origin. They were:—

1. Iron arrow points, which were given him the day he was named.
2. A small strip of thin iron sheet with three holes punched in it (fig. 1). This signifies the name of his grandmother Thako, who bequeathed it to her daughter, with instructions, should she have a son, to call him Thako. (Thako is Ugada's second name.) This may point to some old survival of a time when men traced their ancestry through the female line. This, however, would hardly seem to be borne out by an examination of Ugada's genealogical tree which only takes account of the male line of descent.

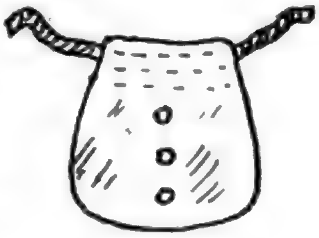

FIG. 1.

3. A transparent crystal of rock crystal or quartz, said to have been picked up in the lake, as the rock around Kisumu is blackish basalt. If the story is true, it was probably dropped by some ancient resident in, or some visitor to, the locality. It is secured in a neat little leather cup shrunk on to the base of the crystal (Fig. 2).

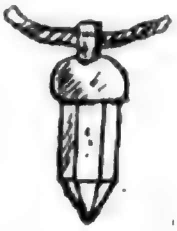

FIG. 2.

4. An irregular piece of very hard yellowish stone which was worn by his father Otiendi; it has a hole bored through it, and an iron ring inserted (Fig. 3).

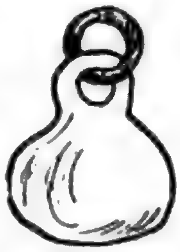

Fig. 3.

5. About half-a-dozen of the Nya-Luo ancient beads, the yellow variety.
6. A piece of goat-horn, worn as medicine to prevent chest complaints.
7. The dried beak of a chicken, which is also worn as medicine for sickness; a medicine man told him to wear it.

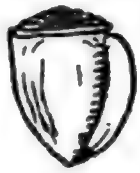

Fig. 4.

8. The upper portion of a large marine shell of the type shown in Fig. 4. The lower portion is cut away, and nothing but the helix at the top of the shell remains (Fig. 5). This ornament is very common among the Wanyamwezi, and probably worked its way from the south. It belonged to Ugada's father Otiendi, and is said to have come originally from Ogalo, chief of Kanyamwa on the south side of the bay.

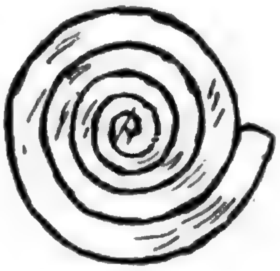

Fig. 5.

9. Around the left wrist was a stout cord through the strands of which were inserted four small pieces of stick (Fig. 6). The sticks are called *omeni* and are worn to prevent the wearer taking harm if one of his children touches him; why, was not stated.

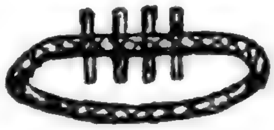

Fig. 6.

10. A heavy brass bracelet worn on the right wrist; this was said to be very old, and to come from Aiyimbo, in the direction of Uganda. It belonged first to his brother Obiero.
11. A tiny square bag of skin, contents unknown, said to contain medicine for rheumatism, from which the old man suffers.

Totems.

Some efforts have been made to elucidate some facts with regard to the presence of a belief in totemism among the people, whose manners and customs are now under investigation. Researches upon this point however are attended with great difficulty, as it is not considered a suitable subject of conversation, and one and all are very reticent upon the point. The natives of the Bantu Kavirondo, Nilotic Kavirondo and Nandi groups all have a belief in the totems or *muziro*, but, apparently, no such thing as totem worship exists, nor do the Bantu and Nilotic Kavirondo believe in their descent from the *muziro* or totem, but a Nandi informed me that many of his tribe did believe in their original descent from a totem.

Among the Bantu people each clan appears to have its own particular totem, and this may have given rise to their custom of exogamy, but in Nandi each individual is said to have his own totem irrespective of the clan. Practically the whole of the Nilotic group appear to have the same totems, but, in some parts, there are certain variations from what may be called the standard list of forbidden foods. Thus, although the exogamy which exists among the Nilotic Kavirondo may have originally arisen from totemism, the present survival of the belief has lost its original character.

In all the groups the totems appear to be animals, no example of a vegetable totem has been discovered.

The Bantu group use the word "*Muziro*" to denote the totem and, contrary to the usual belief, the eating of a totem animal is not thought to be followed by death, but only by a severe skin eruption; and if, by any mischance, the meat of the totem is eaten, the evil consequences referred to can be averted by making a medicine "*dawa*," extracted from certain herbs, and this extract is mixed with the fat of a black ox and rubbed all over the body of the patient.

Among the Nilotic Ja-Luo the totems are called "*Kwero*," and there is a long list of "*Kwero*" animals which are forbidden as food to both men and women; there is, however, an additional list of food that women must not touch.

Upon no occasion is the rule of the *Kwero* relaxed, but, curiously, the animals on this "*index expurgatorius*" are considered malignant in their influence, and it is thought praiseworthy to kill them. Thus any "*Kwero*" animal can be hunted, with the exception of the crested crane (*Belearica gibbericeps*), which is, generally speaking, strictly preserved by all the Kavirondo. The Gemi tribe, however, do not consider it wrong to kill and also eat this beautiful bird. The Gemi, Lego, and Sakwa tribes can also eat the wild cat, called by them "*Ogwang*." The Ja-Luo often wear the teeth of the leopard and crocodile as ornaments, and the skin of the leopard and wild cat; this is not considered an infringement of the "*Kwero*" law.

Examples of the Totems of the Bantu Family.

Clan or Tribe.	Special Totems.
Kisesi clan of Awa Wanga	*Imbongo*, bushbuck.
Marama and part of Tsoso and Isukha...	*Kuru*, waterbuck or *Ikulu*.
Awa-Genya and Awa-Mrashi	*Liusi*, pigeon.
Awa Shekwi of Nyole	*Njofu*, elephant.
In Ketosh there are several, according to to the clan, but over a large portion the special totem is	*Makuyi*, a large black and white stork which appears in large flocks about November, it eats locusts.
Tasoni tribe (Ngaki section)	*Isunu*, reed buck.
Ithako, E. Tsoso, S. Kabras	*Imbongo* or *Ngawe*.
Probably the totem most common in Kabras is	*Mbiakalo*, white ants in the flying stage (but cooked). They can be eaten raw, but not when cooked.

The Totems (Kwero) of the Nilotic Group.

	Name in Tho-Loo.		Name in Tho-Loo.
Crocodile	*Nyang.*	Nile monitor (lizard)	*Ngnech.*
Hyæna	*Ndiek.*	Python	*Nyelo.*
Leopard	*Okwach.*	Mongoose	*Gori gori.*
Baboon	*Bĩm.*	Rock hyrax	*Kumnĕr.*
Monkey	*Ongner (Cercopithecus sp.).*	Tortoise	*Upuku.*
Wild cat	*Ogwang.*	Colobus monkey	*Kuru.*
Jackal	*Buwem.*	Wart hog	*Imbirri.*
Vulture	*Achut-th.*	Frog	*Oguan.*
Crow	*Agako.*	Crested crane	*Iwang.*
Kite	*Otenga.*	Ground hornbill	*Arumtich.*

The following are in addition "*Kwero*" or "tabu" to the women:—Fowls, eggs, elephant, hippopotamus, sheep (latter only among Kisumu and Gemi).

The women's "*Kwero*" are not serious ones, *i.e.*, a breach of the law is not followed by death.

The Totems of the Nandi Group.

	Nandi Name.		Nandi Name.
Hyæna	*Mageliet.*	Water tortoise	*Chebkukuchet.*
Jackal	*Leluot.*	Chameleon	*Nyeretiat.*
Kite	*Chebineret.*	Crested crane	*Kungonyot.*
Buzzard	*Chebkukusiot.*	Elephant	*Beliot.*

The elephant, although looked upon as a totem, can be eaten without evil effects.

I omitted to mention above that the Kadimu people, who live on the Lake near the mouth of the River Nzoia, believe that they are descended from the python; these reptiles are looked upon as sacred and annual sacrifices are made upon a hill in Kadimu to the common ancestor. The Kadimu people are a Bantu tribe which has adopted the language of the Nilotic Ja-Luo, and it is thus the only Bantu tribe in the country which looks upon its totem as its ancestor.

Certain snakes, however, are looked upon as sacred animals among some of the Unyamwezi clans and it is highly probable that, as among the Kadimu, this is due to the belief that the snake was their common ancestor. Many Wanyamwezi consider it a deadly sin to kill a snake, and one occasionally meets an individual belonging to one of these clans who is said to be immune from the effects of snake poison.

The totems of the Koromojo people who live north of Mount Elgon, are snakes, frogs, the monitor lizard, the hyæna, and the cheetah; they believe they will die if they eat any of these. If, however, by any mischance, the meat of a "*Muziro*" animal be eaten, a medicine called *Eyarri*, if taken in time, will save the life of the person. It is made from a tree with very dark leaves called *Emuthi*, the patient is violently purged and, eventually, recovers.

THE KAVIRONDO.

The Rain-maker.

In a previous publication,[1] I have referred to this individual, whose name is Mgahanya, and who is chief of the Shekwi clan of the Nyole tribe, and I have for a long time tried to discover the details of the rites he is said to perform in connection with the art; his magical practices are said to be performed in a patch of dense forest, where he keeps a supply of large earthen pots, and also a number of semi-tame snakes, but I am unable to say whether these stories are true.

There is, however, a curious legend extant as to the way in which he acquired his supposed magic powers. On the south side of Kavirondo Gulf, in Kalachonyo country, there occurs a curious natron lake called *Simbi abūr* (*abūr* means a hole or pit) nearly a mile in diameter, and situate about two miles from the shore of the Nyanza. The lake is apparently in the crater of a small extinct volcano, and the story goes that, in former times, a large village stood on what is now the site of the lake. One evening a strange woman came to the village, called at a house, and begged for food, but her aspect was so forbidding that she was driven away; the same thing happened at the next house she called at. She then went on to a third house, where she spoke to a woman and asked her where her husband was. She was informed that he had gone to drink "*tembo*" (beer) at another house in the village, and the woman gave her some food and water. The strange guest then said she had a message to communicate to the husband; the wife showed her the hut where the men were drinking, and she went to the door of the hut, and called out to the husband of the woman who had befriended her, and he left his friends and came outside. She then told the man and his wife to follow her out of the village. They did so, wondering greatly, and, when they were a little way from the village, she threw something back towards it, and there was a tremendous report, the heavens discharged torrents of rain, and, when day broke, the village was found to be submerged, and the lake covered the site.

The witch then crossed over mysteriously to the north side of Kavirondo Gulf, and was found sitting at the roadside by a man named Kayenga, who lived in the Maragolia Hills. Taking pity on her, he invited her to his village, where she stayed some time. Kayenga thought he would marry her, although he already had one wife. But the witch had an unfortunate peculiarity; if she raised her eyebrows, her eyes emitted sparks of fire. The uncanniness of this scared Kayenga's wife, and she set to work to make life unpleasant for the visitor, constantly reviling her for a witch, and eventually she annoyed her so that she left and went on to the Shekwi people in Nyole, where the great grandfather of Mgahanya married her, and she taught him all the secrets of the art of rain-making. The following is the genealogy of the family of rain-making chiefs:—

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[1] *Loc. cit.*, p. 30.

Agine or Ashue (married the witch).
|
Luchiri.
|
Namonwa.
|
Mgahanya.

The Cult of the "MKIA."

As is well known, the dress of the female sex in Kavirondo is probably the most scanty in the world. Such as it is, perhaps its most distinctive feature is the tail, or "*mkia*," as it is termed by the Swahilis. This is common to both the Nilotic and Bantu races; among the former its name is "*chieno*," and among the latter "*liroya*." The tail is made of fibre, usually obtained from an aloe called "*tuoro*." Among the Nilotic tribes it is stiff, and fairly short, rather like a bottle-brush, from six to eight inches in length. It is usually ornamented at the top by a few small white beads, or half-a-dozen cowries, and is of the natural colour of the fibre. Among the Bantu Kavirondo it is much thinner, and is, moreover, about twelve inches in length, dyed black, and very pliant.

Finding this peculiar attire among two such different races, one cannot help thinking that it was invented by one and copied by the other, and, if anything, I incline to the view that it was introduced by the Ja-Luo, and copied by the Bantu tribes. The Lur people to the west of Lake Albert, who are very closely allied, both in speech and name, to the Ja-Luo, wear it. The Wamia people on the west side of Elgon, who are also of Nilotic extraction, wear a more elaborate and highly developed form, while many of the women belonging to tribes in the Nile Valley wear a kilt of numerous narrow strips of leather, which, one would imagine, might be fined down to the tail behind, and to the little fringe, often worn in front.

There is an interesting ceremonial connected with this article of dress.

The "*mkia*" is the special mark of the married woman; if, however, a young girl is going on a visit to another village, she can wear one on her journey, but must take it off directly she reaches her destination, and not don it again till she leaves. This is done as a sort of artificial protective mimicry; by wearing the tail she is taken for a married woman, and is not likely to be molested by anyone she may meet on the way.

If a woman who has borne a child runs out of her house in a hurry—say, because she has been beaten—and goes into another house without the tail, the house she enters is considered unclean, and the husband has to give a goat, which is killed on the doorstep of that house, before it is considered to be purified; the meat is divided between the aggressor and the owner of the house.

A woman is not entitled to don the tail immediately after marriage, but has to wait a month or two, the husband then presents her with a goat wherewith to purchase this important part of her trousseau.

Among the Bantu tribes, married women generally wear a small black fringe of fibre in front, but the Ja-Luo married women very rarely wear anything in front, the requirements of decency are, in their opinion, quite fulfilled if they have the tail. Ja-Luo girls, in their villages, are quite nude, but when they go to market, or to a dance, they wear, for ornament, a small fringe of various coloured beads strung on fibre. The Bantu women consider that the Ja-Luo tail is not at all a decent covering, and often jeer at them on this account. The chief Mumia thought that the tail might have originally been imitative of the tail of a cow. The Bantu Kavirondo have a superstition that, if a woman wears cloth round her loins she will not bear children.

THE "MIKA" OPERATION UPON GIRLS AMONG THE GUASANGISHU AND NANDI.

Ceremonies attending the Operation on "Nditos" or young Unmarried Girls.

The ceremony among the Guasangishu always take place about the time of the full moon, and is generally performed at sunrise. The proceedings commence the night before by a dance, and the young woman's head is shaved and oiled. At dawn, the old women decorate the young women with their iron necklaces, beads, and other ornaments. The young *elmoran* ("fighting men") of the neighbourhood come along, and the young woman kneels down, while each *elmoran* makes her a speech, and hands her his club and leg bells. The speech is to the effect that she has been brought up among them, fed and protected by them, and has slept with them, and that she is to bear the operation without a sound; if she cries out she will be disgraced among women, and must leave the settlement, but in order that she may not leave them empty-handed, she can take the clubs, etc., given by the *elmoran*, as a symbol that she will not start life empty-handed.

The people then proceed in a cluster to the scene of the operation, while the mother of the girl wails. The girl is then laid out on a skin, and the people stand round in a circle. An old woman sprinkles the *pudenda* with powdered wood ashes, and taking a small curved knife with a blade about 1½ inches long (Fig. 7) excises the *labia* and *clitoris*. Milk is then poured over the wound, and the old women run round, all crying out; this is done to drown any groan or cry she may unavoidably make. The girl stands up, and shakes a bunch of iron leg bells, and she is then wrapped in a skin, and taken away to her hut. During the operation, the girl is held in a reclining position, her head and shoulders resting in the lap of one old woman, while two other women hold each knee. Young and old of both sexes are allowed to be present at the ceremony.

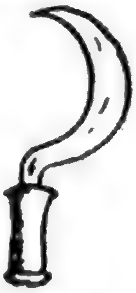

FIG. 7.

Among the Nandi the ceremony is very similar. They dance all night, and shave the head of the girl; in the early morning, the father and brother anoint her head with butter, and the girl, and the women present, are adorned with grass necklaces hanging down to the waist. Only married women are allowed to witness the operation, the males retire after the anointing operation. The actual proceedings commence by the *elmorans* presenting knobkerries to her, as among the Guasangishu. The women then crowd round in a circle to prevent anyone seeing the operation; the girl reclines on the ground in the same position as among the Guasangishu, but not on a skin. No medicine is sprinkled on the part before the operation, the same shaped knife is used, only the *clitoris* is excised, nothing is put on after the operation. The girl stands up, and shakes bells after it is over. The girl's bead-spangled kilt is then taken away, and the skin worn by an old woman is given to her. She is then taken away and is not allowed to look at a man until quite well again. She is supposed to cover her face up, and every day she plasters her face and breast with red earth; within a day or two following the operation, the medicine women build two or three miniature huts of grass, plastered with cow-dung, about three feet in height, shaped like steeples, with a little door closed by a lattice-work of sticks; they are filled with the yellow fruit of the wild *solanum* and no one is allowed to touch or destroy them.

One of these huts is supposed to represent the man's hut—the future husband—and one the woman's; the woman's hut is an inch or two less in height than the man's. Every evening, the young girl has to go and stand close to these huts while she and her friends sing. At the close of the song, the girls who have been operated upon, spit in their hands, and go away. The girl is not allowed either to cook food or to handle it, but it is brought to her, and the native porridge is eaten with a wooden stick. During the time she is convalescent, she is supposed to have as much food as she can eat. The recovery is generally complete in a month, when the old woman takes the girl to the water, and shaves and anoint her head and washes her; she is then entitled to wear the large brass earrings of the older women, and is eligible for marriage. The old skin cloak she has worn during convalescence is taken away and replaced by a new one, and she is ornamented with beads and wire, etc. If she becomes a widow, she no longer wears the beads and wire of a married woman. If a woman becomes enceinte before this operation is performed, the child is killed.

NAMING OF CHILDREN.

Awa-Wanga.—About a month after a child is born, it will be taken ill, and become very fretful; this is a sign that the time has come to name it, and the father goes to consult a medicine man who dictates the child's name.

The father then takes a live quail, breaks its wings and legs, bores a hole through its beak, and fastens the bird to the neck of the child by a string; he also ties one cowrie and one bead (the kind known as "*kiketi*") round the right wrist of the baby, if a boy, and round its left wrist, if a girl. Next morning, the body and head of the quail are cut off, leaving the lower half of the beak of the bird suspended by the string round the child's neck; everyone then knows that it has been named.

Names are often suggested by some event happening at the time.

Mumia was born on the day of an attack by the Wamia or Elgumi people, and was thus named Mumia. Formerly, again, when Europeans were great rarities in the county, if a child was born on the day a caravan camped at the village, it would often be named after the leader of it, if he chanced to be well known, thus "Jaksinis," "Martinis," and "Obilos"[1] are very common.

TATTOOING AND TRIBAL MARKS.

These rarely appear to have any special significance, but, among the Ja-Luo people, it is thought that a woman will not bear children unless she is tattooed.

All Kisumu girls are tattooed just below the navel (Fig. 8). When, however, a woman first becomes pregnant, more elaborate tattooings are added in front as far up as the breasts, and a belt of markings is carried right round the waist. All the men are not marked, it is quite a matter of choice with them. For instance, the head chief of the Kisumu people is not tattooed.

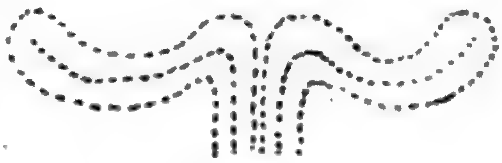
FIG. 8.

The various tribes of the Ja-Luo have slightly differing tattoo marks.

Among the Ketosh, if a warrior kills an enemy in warfare, on his return he has two rows of round marks tattooed on his right chest and continued upwards over his right shoulder; moreover, upon reaching home, it is considered essential that he should have connection with his wife as soon as convenient; this is believed to prevent the spirit of his dead enemy from haunting and bewitching him.

The Turkana and Suk tattoo rows of spots from the chest over the shoulder, but whether this is significant of the warrior having killed an enemy or not, is not known.

An examination of the Ketosh language affords reasons for believing that there is a strain of Koromojo or Turkana blood among them, and this peculiar tattooing custom may be additional evidence of the affinity.

The Ketosh women have a number of raised dots tattooed on their stomachs and abdomen arranged regularly in chess board fashion. An irritant is rubbed into the cuts to produce weals.

NUMERICAL PROPORTION OF SEXES.

In a previous publication[2] I ventured the opinion that the female sex greatly outnumbered the male. My observation was based upon the prevalence of polygamy, and the deceptive fact that the village headmen and elders generally have large numbers of wives. Though still of opinion that the female sex predominate, their numerical superiority is probably not so great as I thought at first; and having had my attention called from time to time to the large number of unmarried adults in many of the villages, I have collected statistics on the subject.

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[1] The native version of the names Jackson, Martin and Hobley.

[2] *Loc. cit.*, p. 18

The summary of these statistics is as follows:—

	Bantu Kavirondo	male births	...	57½ per cent.
		female „	...	42½ „
Nilotic stock	Ja-Luo	male „	...	42 „
		female „	...	58 „
	Nandi	male „	...	48¾ „
		female „	...	51¼ „

It thus appears that among the Bantu tribes the number of male births is in excess, and among those of Nilotic origin, particularly among the Nilotic Kavirondo, the female births are in excess.

The statistics also show the average number of children in a family among the various races.

		Average Number of Children.
	Bantu Kavirondo	7·75
Nilotic stock	Ja-Luo	10·6
	Nandi	2·6

Of course in times past the wastage of male life was extremely heavy, and in spite of the more peaceful times now prevailing, still is so.

In connection with this subject I may mention that as the country settles, and the male sex obtains a better chance of survival, I am hoping that the custom of marriage by purchase, which entirely prevails in this area, will prove an incentive to the younger male population to turn their attention more to the habit of working steadily for hire, in order to obtain the wherewithal to buy their wives, and I hope I am not too sanguine in making the statement that I fancy signs of this movement are becoming apparent.

NILOTIC GROUP.

Gemi Tribe, Ja-Luo.—Statistics.

Names of Women.	Total Number of Children Born.	Surviving Children.		Children who have Died.	
		Male.	Female.	Male.	Female.
1. Ubei	9	1	5	1	2
2. Uwur	8	1	1	3	3
3. Unyango	10	3	0	4	3
4. Wabai	11	3	5	2	1
5. Oguma	14	3	6	2	3
6. Ubai....	9	2	5	1	1
7. Uyeri	11	4	5	1	1
8. Unjeri	9	3	3	1	2
9. Okango	9	2	4	2	1
10. Othiambo	10	1	3	2	4
11. Okech	16	3	3	4	6
12. Ocholi	10	2	2	2	4
Total	126	28	42	25	31

Statistics of the Nandi.

Nandi.	Number of Wives.	Children Born.		Surviving Children.	
		Male.	Female.	Male.	Female.
Kerombas, about 65 years old	4				
	1st wife	3	2	2	1
	2nd „	3	3	2	3
	3rd „	0	0	0	0
	4th „	1	1	1	1
Arab Kibei, about 30 years of age	2				
	1st wife	0	1	0	1
	2nd „	died in child birth.		....	....
Arabtalum, about 50 years	5				
	1st wife	2	0	2	0
	2nd „	2	2	2	2
	3rd „	3	3	3	3
	4th „	0	1	0	1
	5th „	2	1	2	1
Arab Katum, about 50 years	2				
	1st wife	3	3	1	1
	2nd „	died in child birth.		....	....
Jenjoria, about 60 years	2				
	1st wife	0	1	0	0
	2nd „	0	2	0	2
Total	....	19	20	15	16

Bantu.

Awa-Ware of Lusinga.—Statistics.

	Number of Children.	Children.	
		Male.	Female.
Woman No. 1 ...	10	8	2
,, 2 ...	9	6	3
,, 3 ...	4	1	3
,, 4 ...	9	4	5
,, 5 ...	10	4	6
,, 6 ...	8	3	5
,, 7 ...	11	6	5
,, 8 ...	5	3	2
,, 9 ...	6	5	1
,, 10 ...	9	6	3
,, 11 ...	7	5	2
,, 12 ...	7	4	3
,, 13 ...	8	6	2
,, 14 ...	6	2	4
,, 15 ...	1	...	1
Total	110	63	47

Statistics of the Awa-Wanga.

	Number of Children.	Children.	
		Male.	Female.
Woman No. 1	10	3	7
,, 2	8	5	3
,, 3	6	4	2
,, 4	9	2	7
,, 5	9	6	3
,, 6	7	4	3
,, 7	9	5	4
,, 8	6	5	1
,, 9	12	10	2
Total	76	44	32

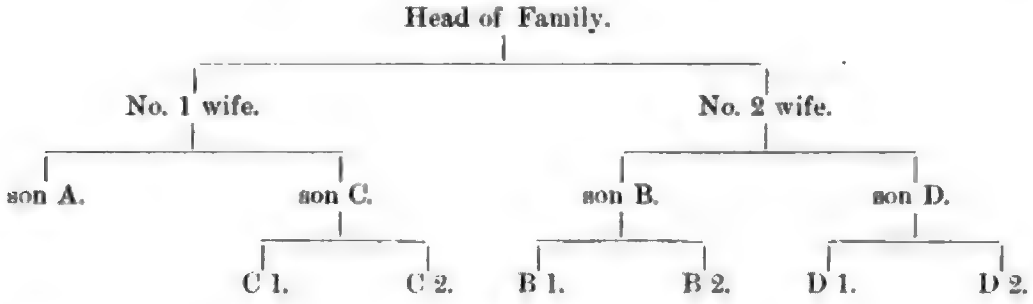
THE ISIRA CUSTOM.

In Sir Harry Johnston's recent work on the Uganda Protectorate, reference has been made to the presence of a vendetta custom among the Kavirondo, in which, if a man is killed, the sons of the deceased endeavour to hunt down the murderer, and if they fail, the sons again carry on the feud.

This custom doubtless accounted for much petty bloodshed in times past. I am glad to say, however, that it is dying out now to a great extent, and one murder no longer leads to a succession of crimes.

The old blood feuds are, however, still recognised, and a man may not eat with a person with whom his branch of the family has a blood feud, or, it is believed, he will surely die within 24 hours.

To make it clear how this curse operates, I append an example in which a man kills his brother by a different mother.



The feud commences by A killing B. After this D will not, nor dare, eat with A or C. In the next generation B 1, B 2 and D 1, D 2 cannot eat with A or C, neither can they eat with C 1 and C 2, although they are only nephews of the murderer, but they belong to that branch of the family through their common mother.

Curiously enough, although this custom is hinged on the female line, it only applies to the males of the family; the females can eat with the descendants of the tainted line without evil effects.

The men are desperately afraid of unconsciously infringing the *tabu*; if a member of a murderer branch has cooked his food in a certain pot, that pot is defiled for any representative of the other branch; thus when a number of men are travelling together and the cooking pots are few, the situation becomes rather difficult at times and numerous disputes arise. Everything connected with this custom is called "*Isira*" by the Bantu Kavirondo.

The custom has been adopted in a half-hearted manner by the Nilotic Ja-Luo, but it is not carried out in such a persistent manner, and rarely goes so far as the defilement of the cooking utensils above described.

Among the Bantu people of the Kakumega Tiriki, this *Isira* custom is often indirectly taken advantage of in rather a cunning way as a means of obtaining revenge for their private grievances. Suppose a member of a certain clan has suffered an injury at the hands of certain other members of his clan, *e.g.*, has had his wife enticed away or had a cow stolen, he will often proceed to the territory of a neighbouring tribe and lie in ambush, attack and spear the first passer by, likely to fall an easy prey, and will then return home.

In a few days it will leak out that one of the "Wa-so and so" has done this, and the clan of the murdered man will up and wage war with the clan of the murderer, who hopes to obtain his revenge vicariously in this manner; latterly, it is said, it has been done in the hopes that the administration will be induced to punish the clan, and, incidentally, the man who has wronged him.

As a variant of the same line of conduct during the last few years, several cases of suicide have been brought to my notice.

For example, in Nyole district a young man one day had a violent quarrel with his own mother while cultivating, and eventually beat her with a stick. She ran crying to a village near by, and one of the elders came out and gave the young fellow a thrashing; to every one's astonishment the young man hanged himself that afternoon, and the people of the vicinity told my agent, who went to enquire into it, that he had committed suicide so that his blood relations might lay his death at the door of the elder, and thus start a blood feud against him. Word was, naturally, promptly sent forth that such a procedure would be strongly discouraged, and the incident apparently closed.

MISCELLANEOUS CUSTOMS AND BELIEFS.

The Ja-Luo believe that the sun goes back to the east overhead during the night, hidden behind the heavens. They use the word *Chieng* indifferently for sun and the Deity. They do not associate the daylight sky with the light of the sun, but look upon it as something quite distinct, and asked what became of it at night. It is known by the term *Polo*. They professed the belief that Europeans were the children of the sun.

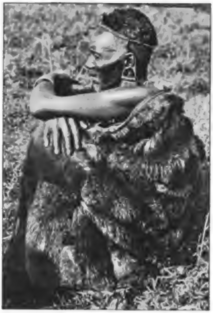
They believe that menstruation is caused by the new moon, and also that a woman can only become pregnant at the time of the new moon, and generally that the moon has a great deal to do with the occurrence.

During menstruation a woman does not cook food for others, but merely her own food. She performs all other work as usual.

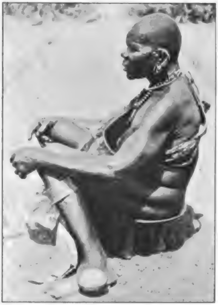
The people have no ceremonies connected with fire, such as the extinguishing of all the fires at a certain time, and the relighting with certain rites.

Among the Awa-Wanga, many believe that within five or six days of the birth of a child the parents must cohabit, or the child will die. After the birth of twins, the parents are secluded for from twenty days to a month; at the end of the ordained period the brother of the man then formally opens the door of the hut and the couple can go about as usual. This seclusion of the male parent is probably an attenuated relic of the "*couvade*" custom.

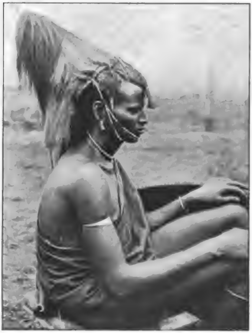
Journal of the Anthropological Institute, Vol. XXXIII, 1903, Plate XXVIII.



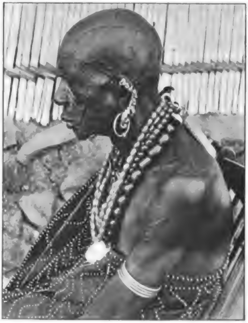
Arabchebki, Lumbwa Chief.



Ondun: Kisumu Chief (Ja-Luo).



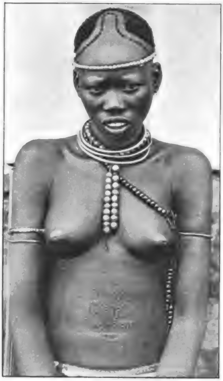
Guasangishu Warrior (Moran).



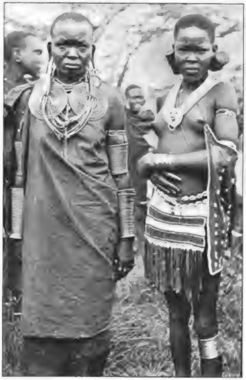
Ugada, Kisumu Chief (Ja-Luo).

ANTHROPOLOGICAL STUDIES IN KAVIRONDO AND NANDI.

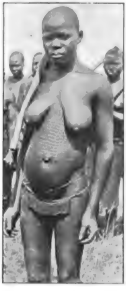
Journal of the Anthropological Institute, Vol. XXXIII, 1903, *Plate XXIX.*



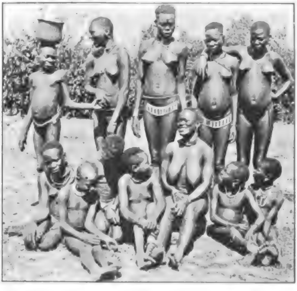
Jaluo Girl ; Kajulu Tribe.



Lumbwa Woman and Young Girl.

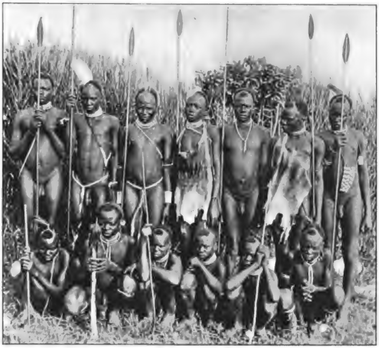


Ketosh Woman (N. Bantu).

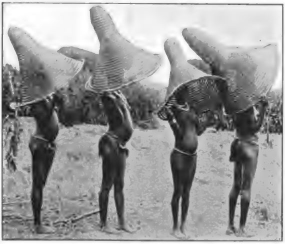


Kisumu Girls.

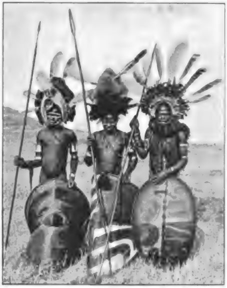
ANTHROPOLOGICAL STUDIES IN KAVIRONDO AND NANDI.



Koromojo Warriors.



Fisherwomen ; Kisumu.



Karungu Warriors (Ja-Luo).

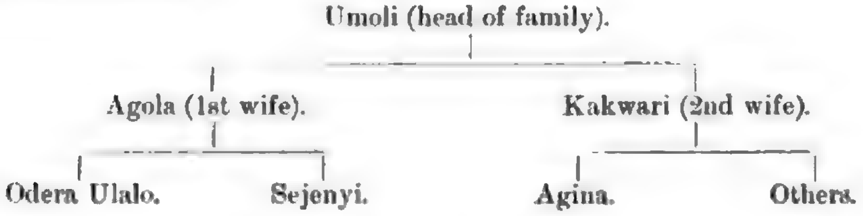
ANTHROPOLOGICAL STUDIES IN KAVIRONDO AND NANDI.

About 30 miles east of Kisumu in Nandi country, there is a forest-clad extinct volcano named Tinderet, and the Kamililo Nandi, who inhabit its southern and western flanks, tell a legend that high up on the mountain there is a cave, in which Ilet, the spirit of the lightning, who descended there in the form of a man, took up his abode. After his descent it rained incessantly for many days, and the Oggiek or Wandorobbo hunters who lived in the forest were nearly all killed by the terrible downpour. Some of them, while searching for the cause of the rain, found Ilet in the cave and wounded him with their poisoned arrows. Thereupon he fled, and died in Arab[1] Kibosone's country; directly he was dead the rain ceased.

LAWS OF SUCCESSION AMONG THE JA-LUO.

In the Gemi tribes, and several others of Nilotic origin, the following rule holds with regard to the chieftainship. The chief is always the eldest son of the wife whom his father married first.

To give an example:—



Agola was married to Umoli before Kakwari, therefore the chiefs are henceforth chosen from the offspring of Agola, and upon the death of Odera Ulalo, his son being quite small, the second son of Agola, Sejenyi by name, was elected chief. This rule was observed, although Agina is an older man than either Odera or Sejenyi.

It is possible that this may point to the existence in past times of uterine filiation among this race.

ORIGIN OF NAME OF DISTRICT OF KAVIRONDO.

I have often made enquiries into the origin of the name of Kavirondo, and the Kisumu elders inform me that it is the name which the people of the south side of Kavirondo Gulf apply to the people of the north side; it is, however, a term only used when they meet at a dance and smoke bhang and sing about old times. They call the people of the north side Kavirondo, because they were vanquished by the latter and driven across to the south side of the bay; it was thus, originally, more or less an epithet of reproach.

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[1] In the Nandi language *Arab* in front of a prefix name means "son of," thus Arab Kibosone means "son of Kibosone."

STONE AXE FACTORIES NEAR CUSHENDALL, COUNTY ANTRIM.

By W. J. Knowles.

[With Plates XXXI-XXXVIII.]

Several sites in which stone axes have been manufactured are known in county Antrim, but none of them have been carefully examined. The rough unpolished axes from Rathlin Island are well known, and most antiquaries have specimens from that place in their collections. A number of axes, dressed into shape by chipping, but unpolished, had been brought to me from time to time from the neighbourhood of Clough, near Ballymena, but I had obtained no flakes, broken axes, or anything of the nature of a failure. Suspecting that there had been a manufactory somewhere in that district, in order to investigate the matter, I made frequent visits to the place a few years ago. On inquiry, I obtained some flakes of black stone and some poor and broken specimens of axes. I concluded that there must have been a centre of manufacture in the farm belonging to Mr. John Crawford of Glenleslie, and that possibly other sites existed in neighbouring townlands. I encouraged the farmers and labourers to collect the flakes and broken axes, and each market day in Ballymena specimens, in greater or smaller numbers, were brought to me. I soon received quite a large series of flakes, broken axes and failures or partially made axes, chiefly from the townlands of Glenleslie, Tullykittagh, and Moneyduff, near the village of Clough. Many of the specimens, though considered of little value, were interesting and instructive, and I found that many of the flakes were dressed round the edges into points and scrapers. Though there were undoubtedly one or more sites of manufacture in this district, the land on which they stood had been so long under cultivation, that they had been almost obliterated.

A man named Henry Green, a sort of pedlar, seeing me buy poor objects like black flakes, shortly afterwards brought me a number of flakes of black rock from near Cushendall, found in a field belonging to Mr. Richard McCurry of Tamnaharry or Tavnagharry in Ballyemon Glen. This being a new place for such objects, I went there immediately, and found that the field contained a well-marked site of an axe factory. The land had only recently been broken up for cultivation, and the whole process of manufacture of axes was plainly exhibited. Pieces of natural rock partly chipped, rough axes, some of which were broken, flakes and hammerstones, were lying around in considerable numbers. Nothing had been removed, unless it was so large, that it interfered with the plough, as the objects were considered of no value. The hammerstones were mostly rounded balls, of black stone, the same as that from which the axes were made; but a few quartzite boulders, hammered on the ends, were also found. The flakes were, as a rule, short and broad, and such as had been struck off in the manufacture of axes. Many had wings projecting from one or both sides of the bulb of percussion, and some were dressed into spear-like points and scrapers. A few core-like pieces and long flakes were found, but I saw no evidence that this kind of rock had been used, like flint for procuring flakes, for the flakes alone. Flint is found in the neighbourhood, and many long flakes and scrapers of that material were found in and around the sites, but the waste flakes of the manufactories were also used abundantly for all purposes of cutting and scraping. The field containing these objects is on an elevated part of McCurry's farm, and in view of the sea. The prospect is delightful, but I am not sure that the axe-makers resided here or used the place for anything but a manufacturing site, as I saw no kitchen middens or remains of food, such as shell-fish and split bones of animals; nor was there any fragments of pottery, such as accompanied the manufactories of flint implements at While Park bay and other places round the coast.

After collecting a large number of articles in this field, I examined other fields in the neighbourhood, finding many comparatively barren of flakes and implements. Eventually, I found another site in Mr. James Quinn's farm in Clougheen, about half-a-mile distant from the site on McCurry's farm. The place which showed the greatest evidence of manufacture was around a damp spot in one of his fields. Probably there was a well here originally, and the people may have sat round it and manufactured their axes. I collected a good many objects from this site, but though none of the objects had been previously removed, the land had been a good deal cultivated, and therefore this site had not the freshness of the one previously described. I found, in this case also, that as one moved away from the site, the objects became scarcer. From this farm, it is about half-a-mile to a small house which has been erected for a herd near Tievebulliagh, a peak 1,346 feet high. Around this house many objects were collected, and at one spot where a fence had been made and some sward removed, I have picked axes, flakes, and hammerstones, out of the bared ground, and also out of the sods which had been put on the fence. A field in front of the house, which was the only piece of land brought under cultivation in this neighbourhood, was full of flakes and rude pieces of rock, many of which were partially chipped. Here, as in the other sites, nothing had been removed, unless it was large and impeded the plough, in which case it was carried to the fence. Farmers are surprised that such poor objects should have any value, and when shown a large axe, they assert that they often put such objects in drains. I can believe this, as the finest specimen I have was used as a wedge to fasten one of the stakes in a byre, or cowhouse, to which cows are tied during the night, I made frequent visits to these and other sites, and had perfect liberty to walk over the fields and examine and collect without hindrance. The young people on the various farms, when they knew the kind of objects that were desired, collected them for me, and often my collection was so large, that I was obliged to employ a horse and cart to convey it to the railway station. I extended my survey over the whole Glen of Ballyemon, and found other sites and obtained specimens, similar to those already enumerated, every time I went round. The proper season is the spring, when land is being ploughed and harrowed, or at the time of digging the potatoes in the autumn. In the summer no search was made, as trespass on the fields at that time would have been injurious to the growing crops. At this season I explored the part of the district outside the area of cultivation, in the high land surrounding the valley. My wife and I went to Cushendall for a short holiday, and spent our time in wandering about the hills. One day in climbing to the top of Tievebulliagh, we came on a place where the peat and soil had been denuded and washed away, revealing several sites which had never been disturbed. We found a great many axes, broken specimens, and partially worked objects, rounded hammerstones of black rock, and some large ones made of waterworn boulders of quartzite. The flakes were in thousands, and many of them were worked along the edges into points and scrapers, like the "pointes" and "racloirs" of palaeolithic time, which are described and figured by French authors. It took my wife and daughter, with myself, several days to remove all the manufactured objects. I did not seek other assistance, as my previous finds had now come to be talked about, and I did not wish to reveal my discovery on Tievebulliagh until I had made a thorough investigation. The objects found on these sites were not mixed with soil, or partially covered up, as was the case with those found in the cultivated fields, but everything was seen as it was left by the early workmen. The peat at the sides of these bared places often stood up like banks, and I have taken specimens from beneath the peat where it rested on the clay. The peat had therefore formed after the workmen had made the axes on the top of Tievebulliagh. All around this mountain there are signs of an active and extensive industry in the manufacture of the black stone axes having been carried on. Even on the east side, which is almost perpendicular, there are ledges on which they have sat and carried on their work. Now, after many centuries of denudation, the talus formed at the foot of Tievebulliagh is full of flakes, broken axes, and other signs of the industry. My wife and I have gone to the talus on several occasions with our small picks, and have always been able to fill our bags with instructive specimens. Many of the farmers' sons are now acquainted with this talus and its contents, and call it the quarry. They come with their picks and turn over parts of the numerous streams of stones that have come down the mountain side in search of specimens, and a find of some importance has occasionally been made.

While the sites on the top and sides of Tievebulliagh yielded examples that were instructive, no very finely manufactured specimens were found. These would no doubt be carried away for use or for grinding and polishing at places lower down in the valley, where the Old Red Sandstone appears at the surface, or in the beds of streams. However, although axes in various stages of grinding and polishing have been found, I have not, as yet, succeeded in finding in Glen Ballyemon any grinding stones, fixed or otherwise. Some may yet be found, as I have made frequent inquiries for them, and have drawn the attention of the more intelligent inhabitants to the matter. The Old Red Sandstone is the rock that would no doubt be used for the purpose, but it appears in massive form in many parts of the valley, and as grinding could as easily be done at one spot as another, and on a new piece of rock as well as one previously used, no special piece of rock showing marks of grinding may be found. In the valley of the Bann, where sandstone is scarce, many pieces have been found, showing hollows and grooves formed by grinding axes on them.

In addition to the places already mentioned, flakes and axes similar to those described, have been found in the neighbouring valleys of Glendun and Glenariff, indicating sites of manufacture.

In Glen Ballyemon, several varieties of rock were used for axes, but the kind which was most in favour was a close-grained rock of bluish colour which, as far as I can find, is not native to the district. Metamorphic rocks do occur in the valley, but I have not as yet observed this close-grained bluish rock anywhere *in situ*. It always appears in the form of boulders, which show glacial striæ. The flakes show well-marked bulbs of percussion and a clean fracture. It is a mistake, however, to say that bulbs of percussion are peculiar to particular kinds of rock. The bulb is caused by the blow, and any rock will show a bulb, though in rocks of fine texture, it will be more distinct than in those of coarse grain. I have flakes of granite and quartzite showing well-marked bulbs. In the rock in question, the bulbs are as well-defined as in any flakes of flint. This bluish close-grained rock from which the axes are made, is found all over the valley, until we reach the high ground forming the base of Trostan. On this mountain I did not observe any traces of the rock, nor did I observe any signs of manufacture of axes out of this or any other kind of rock; but on the top of Tievebulliagh, I found boulders of the bluish rock firmly imbedded in the boulder clay, and in cases where the axe-makers could not excavate them, they chipped such parts as remained aboveground. We find that when a boulder was too heavy to be removed, they endeavoured to break it up, though I have seen some boulders which have resisted their efforts. There is a fine large piece of this rock weighing several hundredweight in front of Mr. James Quinn's house, which has had many flakes and spalls removed from it, and now with its weathered bronzy appearance, it looks more like a lump of metal than of stone. I think it is likely that this rock may have been brought by glaciers from Scotland, since we do not find it *in situ*. Boulders of Ailsa Craig rock are found in various parts of county Antrim, and it was recently found in boulder clay as far inland as Ballymena. It is, therefore, not improbable that the other rock may be of Scottish origin.[1]

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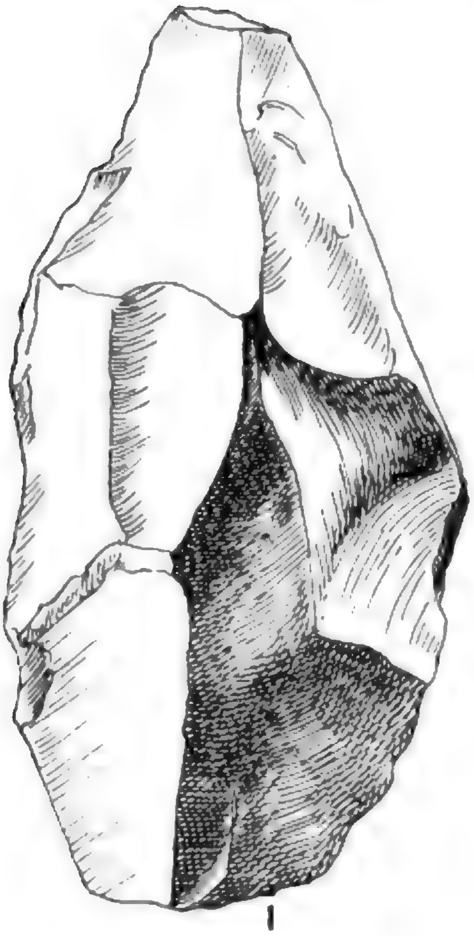
[1] Professor Cole has kindly examined a specimen of the rock and writes—"The flinty Antrim boulder, a fragment of which we have long had in hand from you for cutting, has

On examining the objects collected from the sites in the neighbourhood of Cushendall, more particularly those found in an undisturbed state on Tievebulliagh, one can easily observe the whole process of the manufacture of axes. Boulders are seen with only a few flakes removed, which, in this unfinished state, look like rude paleolithic implements (Pl. XXXI and XXXII). Others will be found nearer completion, or perhaps sufficiently blocked out to be ready for grinding and polishing (Pl. XXXIV and XXXV). I have a find of five objects from Glenariff, showing one specimen very rudely blocked out (Pl. XXXIII, 4), another nearer completion, but still in a rude state (Pl. XXXIII, 5), while the other three axes are as finely finished as it was possible to do by chipping (Pl. XXXIII, 6, 7, 8). So perfect are these, that a section through them would be almost as symmetrical as that through a convex lens. Two of these are of the same size, seven inches long and three inches broad. The third is six inches long.

The objects found in the various sites consist chiefly of axes. These were evidently the main object of manufacture. Some pick-like objects were found, which must be considered a distinct class of tool. Some of the same kind made of flint have been found in various parts of Antrim (Pl. XXXVI, 23, 27 and 28). Some implements with heavy butts and dressed to a point at the opposite end are shown, front and side views, in Pl. XXXVII, 29, 30 and 32, a disc-like object in Pl. XXXVII, 31, and two chopper-like implements are shown, front and side views, in Pl. XXXVII, 33 and 34. The objects figured on Pl. XXXVII are examples of fairly frequent occurrence, which I believe are neither partially blocked out axes, nor failures, but implements finished, as far as they were intended to be, by chipping. Flakes dressed as points and scrapers are shown in Pl. XXXVIII, 35, 36, 37, 38 and 39. The long flakes, dressed along each side, are like the "pointes" of the paleolithic age, and the scrapers (Pl. XXXVIII, 37 and 39) are like the "racloirs" of the same period. Front and back views of two flakes which have been dressed like axes are given in Pl. XXXVIII, 40, 40A, and 41, 41A. An axe of the kitchen midden type, one of several, is represented, front and side views, in Pl. XXXVI, 22, 22A, and two similar views are given of an axe made from a large quartz crystal. The sides of the crystal are unchipped and in their natural state, but a cutting edge has been dressed on it by neat and regular chipping (Pl. XXXVI, 21, 21A.) Two of the hammerstones rounded by repeated hammering, are shown in Pl. XXXVI, 25 and 26. A small chisel, one of several that have been found, is shown with section in Pl. XXXVI, 24.

refused to yield a respectable section. By personally finishing a small fragment, however, I have got it translucent, but even then, this extremely altered mass is not explained. By its iron-ore (magnetite) and dull linear colourless areas (probably once felspars), I take it to be an altered fine-grained diorite (an aphanite), which has been penetrated late in its history by a vast number of minute chalcedonic veinules. The amphibole or pyroxene is now represented by iron oxide only, and the infiltered chalcedony gives the flinty character in which the ancients delighted. But I know of no other case precisely similar—though basic rocks, as Darwin noted in the Canary Islands, may become silicified like acid ones. I feel, however, that this curious mass really had an igneous origin."

Nearly eight hundred whole axes have been obtained by myself, besides a great many broken specimens, but the sites having become known, other collectors have searched in them, and have obtained flakes and some axes. The broken axes are mostly small portions of butts or edges. An unlucky blow in the course of manufacture had caused the axe to break, but it is very strange that I have never been able to restore any broken implements, as has been done in the case of Mr. Seton-Karr's finds at the flint mines in Egypt. I believe the reason why we cannot similarly replace broken pieces found in these Irish factories, is due to the fact that the larger pieces of the broken axes were reworked into smaller implements. I have found specimens which support this idea. The axes have been made in various sizes. One fine specimen (Pl. XXXII) is 14¼ inches long and weighs 8¾ lb. The next largest is 14 inches long and weighs 7 lb. There are others weighing 6 lb., 5 lb., 4 lb. and 3 lb., but the great majority average about 1 lb. in weight. Some small chisel-like objects weigh only 1 or 2 oz. While a few are well-made and finely finished, the greater quantity are rude and coarsely made. Many are crooked, twisted and unsymmetrical, and the part intended for an edge is often thick and clumsy. One could readily imagine that these rude specimens were failures, and had been rejected, but judging from numerous examples in my possession that have been partly ground and polished, I do not believe that the rude specimens I have mentioned were thrown aside as waste material. I am convinced that a piece of good rock was not regarded as a failure, on account of its not working true. When a lump could not be removed by the hammerstone or a thick edge could not be made finer, it appears to me that specimens were not rejected for these defects. A sort of pecking or bruising seems to have been resorted to, for removing an ugly lump; but the chief and final remedy was patient grinding. Pl. XXXIV, 9 and 10, show some of these rude axes that would be finished off by grinding. Pl. XXXV, 15, 19 and 20, show other rude examples. Pl. XXXV, 15, shows a very common type with one broad squared side, the other sharp or nearly so. Pl. XXXV, 16, shows both sides squared, the square sides in most cases like this, being the natural old surface of the stone. Pl. XXXV, 19, is also a typical specimen, and though the chipping has been finished in a very clumsy manner, the process of grinding has been begun. Pl. XXXV, 20, shows a thick edge, but though no grinding has been done on the specimen figured, I have other examples of a similar character, where considerable progress had been made in grinding. Pl. XXXV, 17 and 18, are coarse and rude flakes, but both have had edges ground on them at their lower extremities. Pl. XXXV, 17, has an indentation chipped out on each side. Pl. XXXIV, 11, shows an example of the pecking or hammering so as to bruise the surface and reduce it to powder. Pl. XXXV, 13 and 14, are examples of a butt and an edge end of broken axes, but many of the pieces are only about half the size of these. In addition to the rude specimens many, I consider, are only partially manufactured, as Pl. XXXI, 1 and 2, and Pl. XXXIII, 4. The figures are all shown half linear size.



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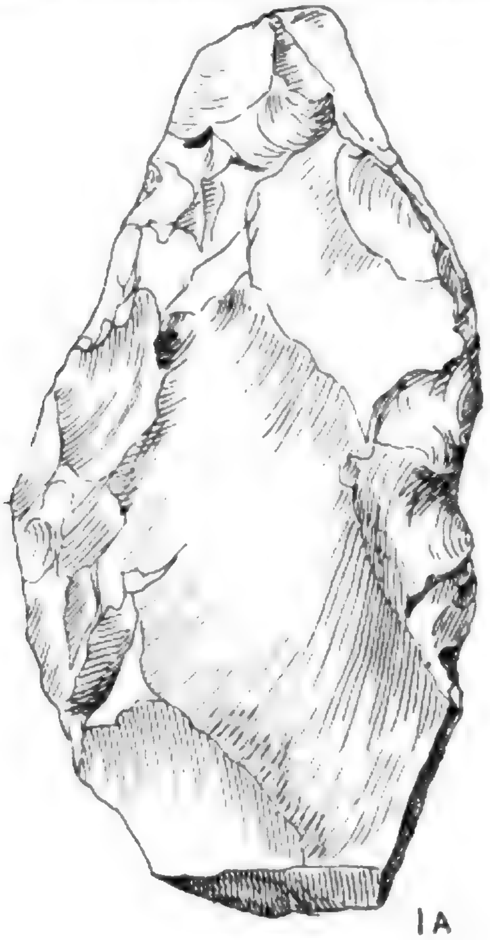

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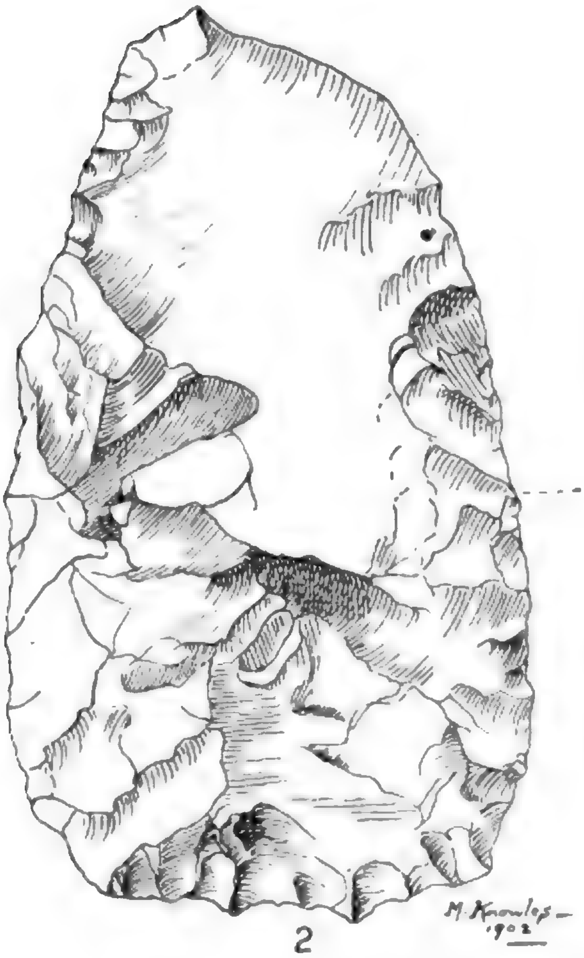
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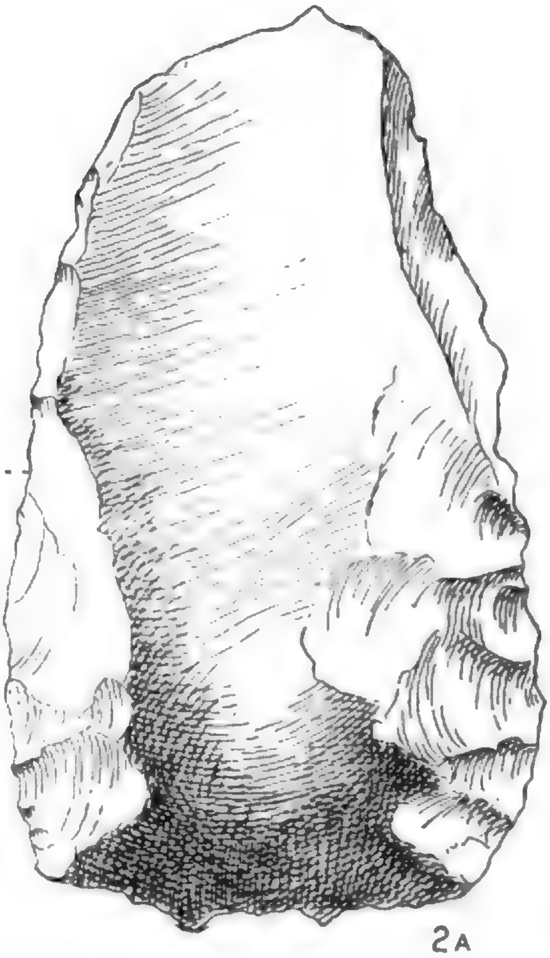
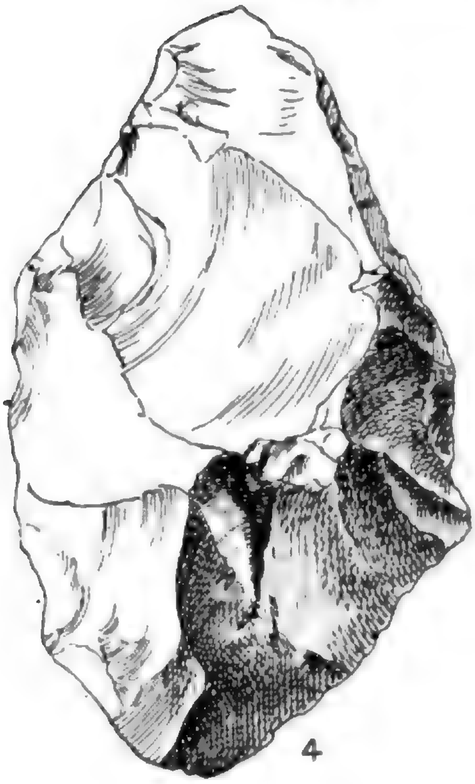


2A

A STONE AXE FACTORY NEAR CUSHENDALL.



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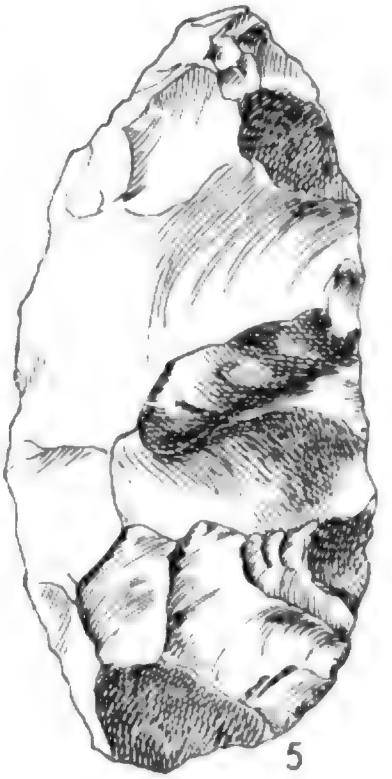

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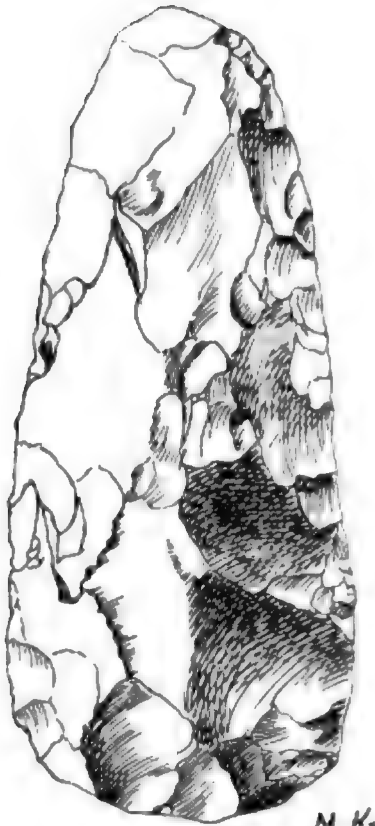

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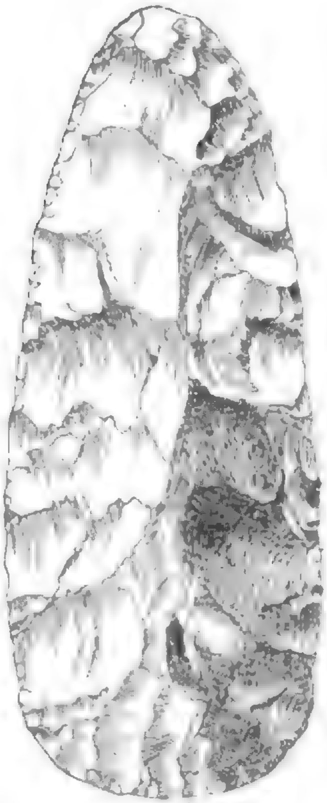

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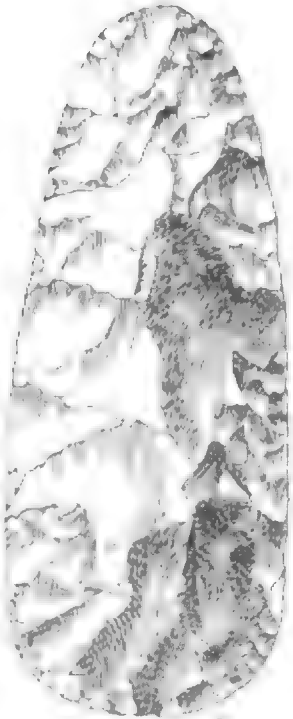

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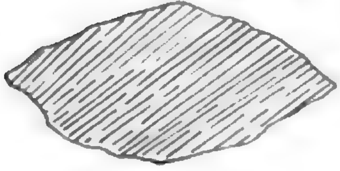
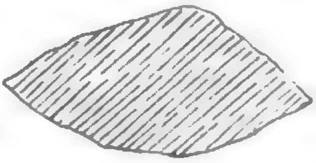
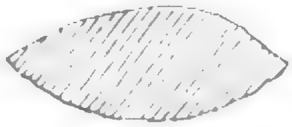
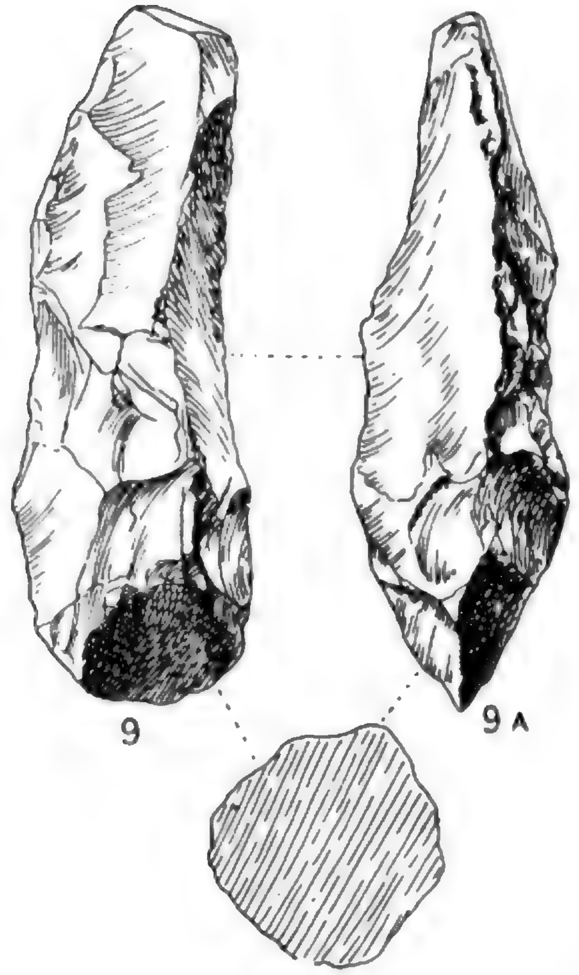


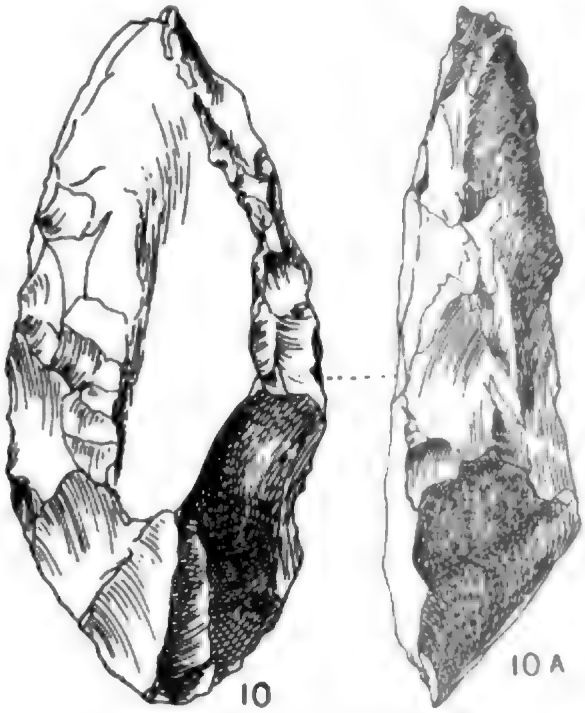


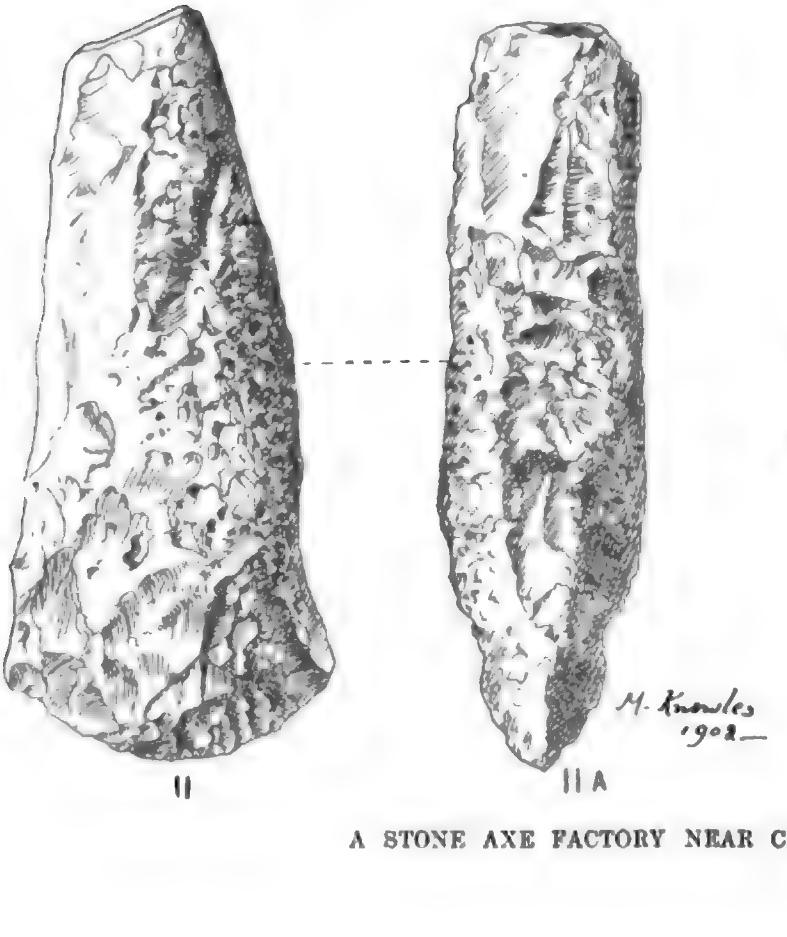


A STONE AXE FACTORY NEAR CUSHENDALL.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, *Plate XXXIV.*







M. Knowles
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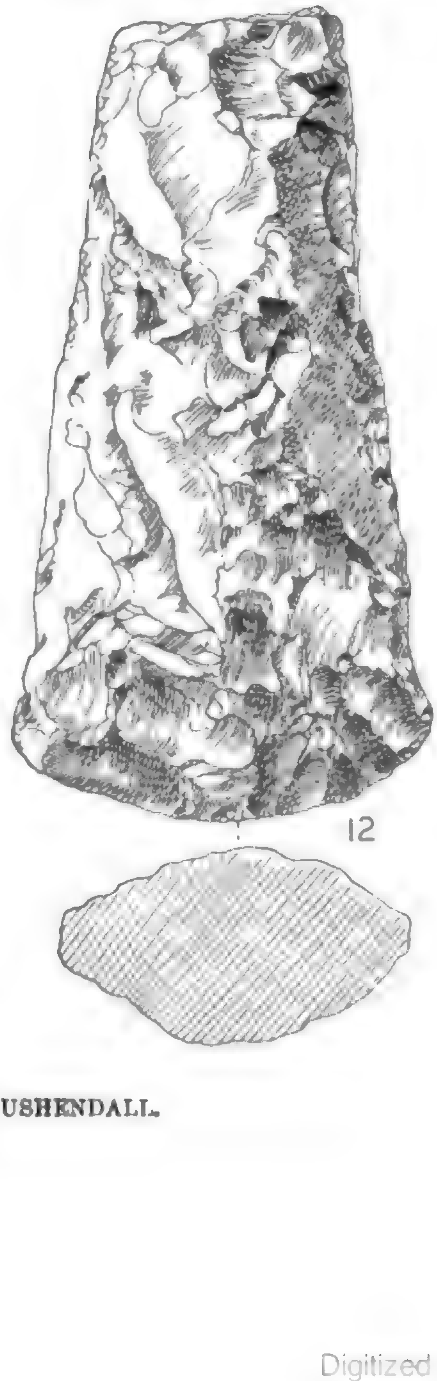
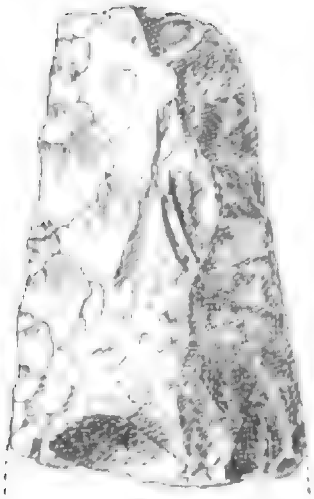


A STONE AXE FACTORY NEAR CUSHENDALL.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, Plate XXXV.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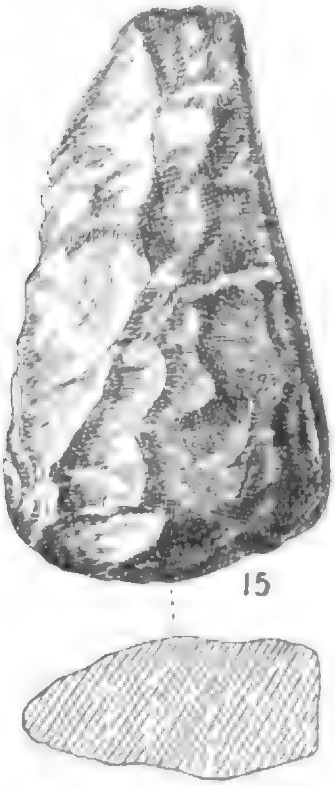
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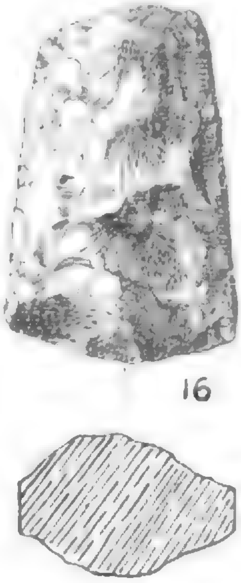
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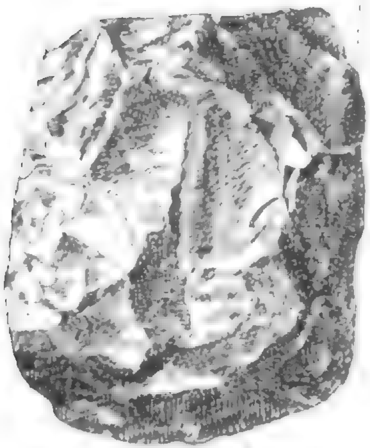
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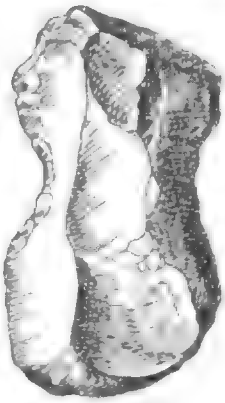
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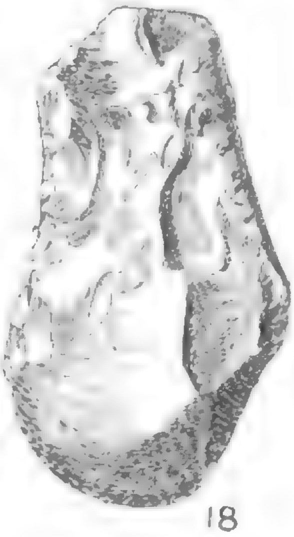
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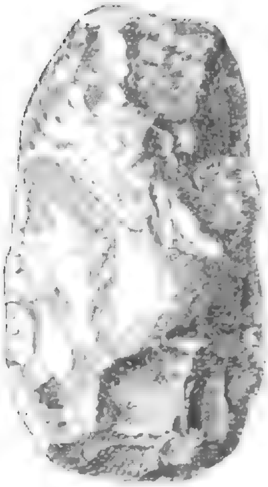
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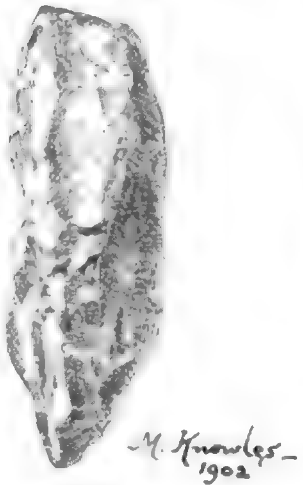

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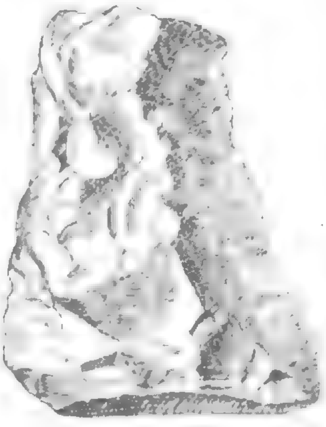
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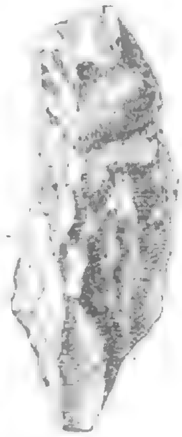
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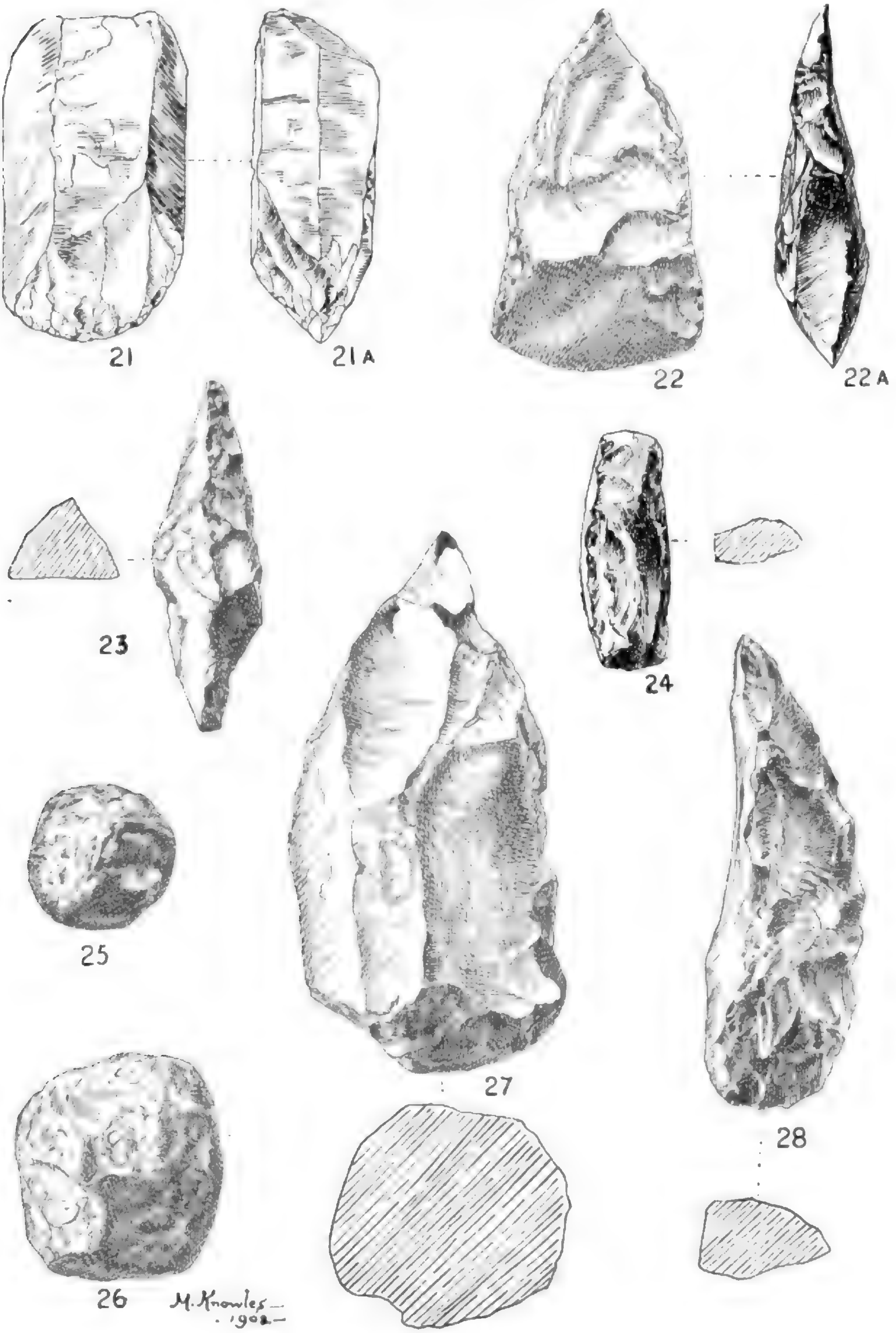
A STONE AXE FACTORY NEAR CUSHENDALL.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, *Plate XXXVI.*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M. Knowles
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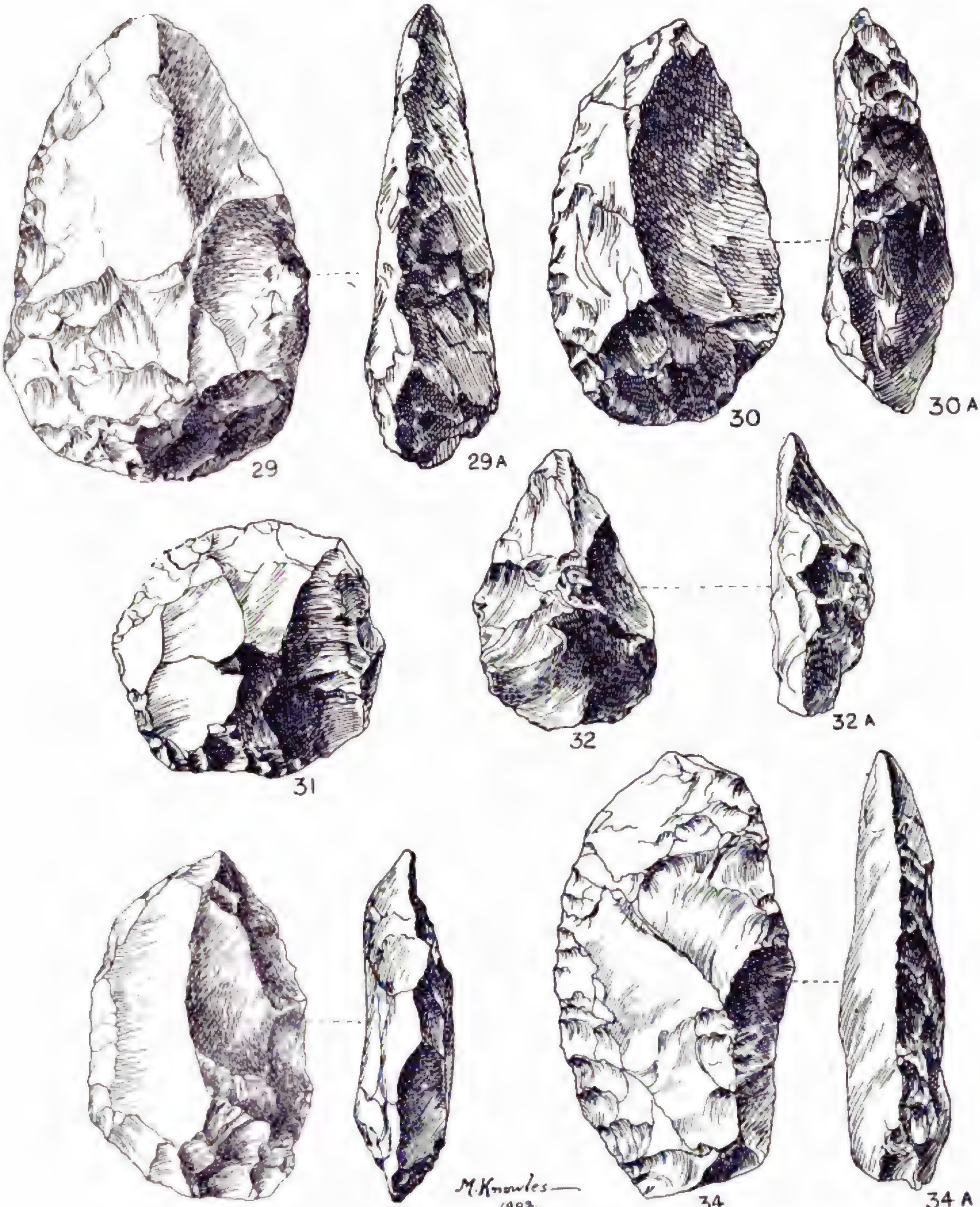
A STONE AXE FACTORY NEAR CUSHENDALL.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, *Plate XXXVII.*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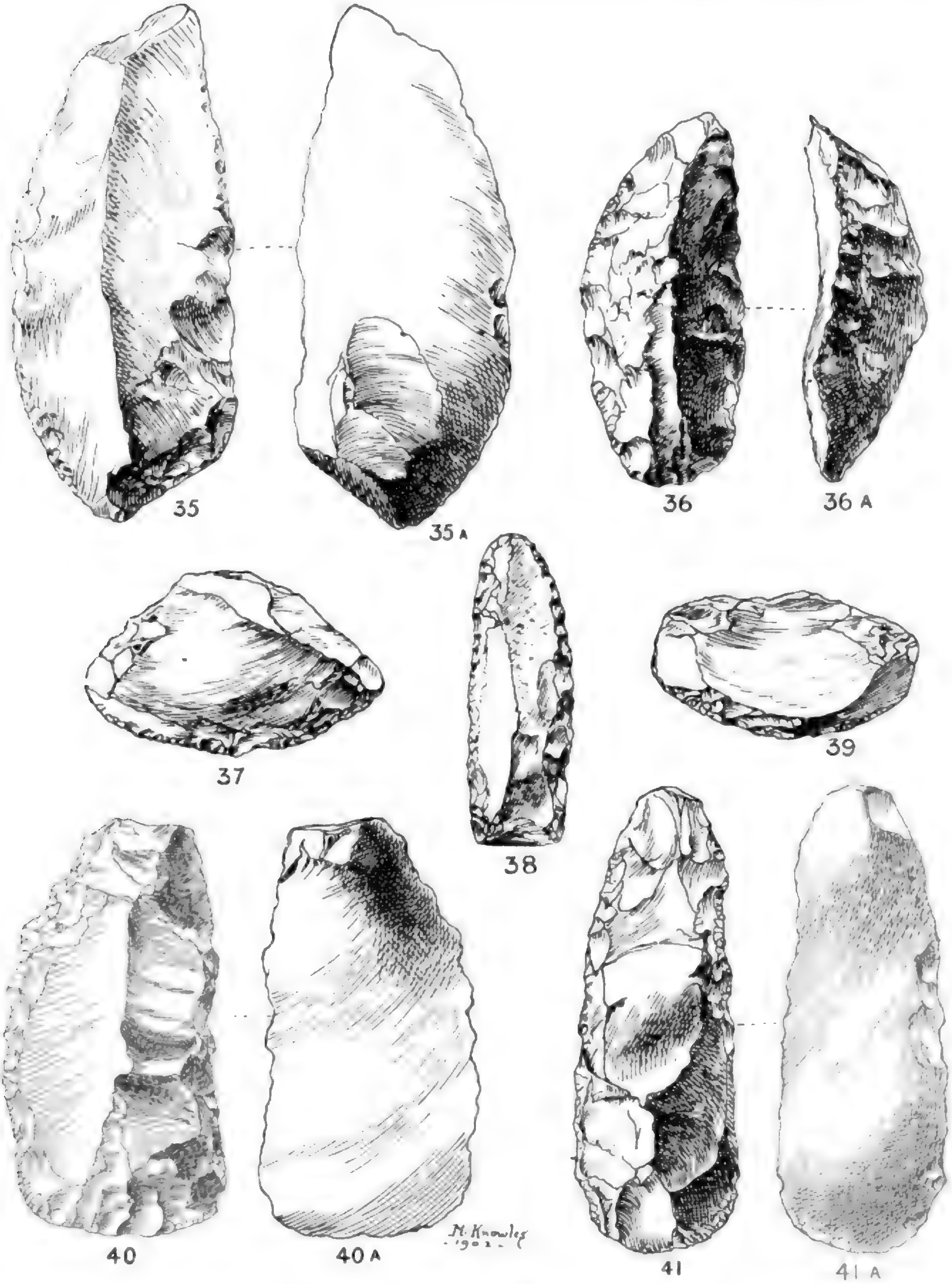
A STONE AXE FACTORY NEAR CUSHENDALL.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, Plate XXXVIII.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M. Knowles
1902
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A STONE AXE FACTORY NEAR CUSHENDALL.

THE EARLY POT-FABRICS OF ASIA MINOR.

By John L. Myres.

[With Plates XXXIX–XLII.]

In a communication made to this Institute about seven years ago (*J.A.I.*, xxvii, 171), I ventured to adduce, as an argument for a Cypriote origin for some part of the early bronze culture of Europe, the distribution, over Asia Minor and South Eastern Europe, of a group of pottery-fabrics with characteristic red-polished technique. It was pointed out, at that time, and was indeed obvious throughout, that the very scanty knowledge which we had of the ceramic history of Asia Minor interposed a very weak link in the chain of evidence; that it was not clear that the red-faced fabrics of the Hellespontine area had anything directly to do with those of Cyprus; and that something more than mere agreement of technique was necessary, before the similarities of fabric, which were admitted to exist, could be held to support the inferences which I submitted.

In the interval which has elapsed, however, a certain amount of fresh evidence has been elicited from Anatolian sites; and in the notes which follow, what I propose to do, is to reconstitute, so far as is possible from this new evidence, the outlines of a ceramic history of Asia Minor, at all events as a working hypothesis until time or circumstances shall restore the true one.

The new evidence to which I refer is derived from four main sources; *first*, the surface surveys of Dr. A. Koerte among the Phrygian sites of the Sangarios valley, and particularly his excavation of the tumulus-site of Boz-uyuk[1]; *second*, the excavations of M. Chantre on Cappadocian sites, particularly at Boghaz-keui and Kara-uyuk[2]; *third*, a large series of potsherds collected on the surface of unexcavated sites, in Phrygia, Cappadocia, and Western Pontus,[3] by Messrs. J. A. R. Munro, J. G. C. Anderson, J. W. Crowfoot, and F. B. Welch, which confirm and supplement in a remarkable way the conclusions to be drawn from the excavations of Dr. Koerte and M. Chantre; and, *fourth*, the evidence which has accumulated, from a variety of sources, round the central discovery, by Professor

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[1] Koerte. *Mittheilungen d. KK. Deutsch. Archæol. Inst.: Athenische Abtheilung* (hereinafter *Mitth. Ath.*) xxiv, 1 ff. (Plates I–IV).

[2] Chantre. *Mission Archéologique en Cappadoce.* Paris, 1898.

[3] These fragments are now in the Ashmolean Museum, except one rich parcel which was lost *en route*; the more important of them are published, through the courtesy of their discoverers, in the plates which accompany this paper. Others, from the neighbourhood of Marsovan, and from certain sites in Galatia, are in the possession of Mr. Cecil Smith, of the British Museum, who has kindly allowed me to examine and describe them. I must also express, once for all, my obligation to Mr. Crowfoot for a brief but most valuable memorandum on his share of the collection, which I shall have occasion to cite more than once; and also for his published summary, *Journal of Hellenic Studies* (hereinafter *J.H.S.*), xix, pp. 34–51.

Flinders Petrie, of the existence of a great focus of redware technique in pre-dynastic Egypt.[1]

The questions to be solved are three: *first*, what was the ceramic history of Asia Minor before the rise of red-polished fabrics of pottery in that area? *second*, what is our present knowledge of the distribution of the red-polished fabrics themselves? *third*, what is the significance of the widespread occurrence, apparently still in pre-Hellenic times, of a group of painted polychrome fabrics in the heart of Cappadocia?

I. The Black Polished Fabric of Hissarlik, and its Homologues.

Our investigation must start, as before, from the one fully excavated site of the series which concerns us; from Hissarlik, the pier head of Asia towards South-Eastern Europe, the *tête de pont* of Europe towards North-West Asia Minor. In the First City of Hissarlik, there was, apart from merely domestic and relatively formless pottery, one dominant ceramic style. Its forms were rude, mostly of the mud-pie order, with a distinct inclination to the simple tensile outlines which betray the leathern prototype, and to those angular uncompromising cylinders which are so typically "wooden." Its technique is wholly handmade.

It is, however, with its surface-treatment that we are mainly concerned. The ideal of the potter, seldom fully realized, but very persistently pursued, was to give his handiwork as smooth, glossy, and jet-black a surface as lay in his power. The means which he employed have been variously described. Schliemann himself adopted Virchow's view, based on experience of black-polished fabrics in North Germany,[2] that the blackening was simply due to smoke stains incurred during the process of firing; and this almost inevitable accident of primitive ceramic lies in any case at the root of the black-polished ideal. But it was obvious that at Hissarlik, as in the finer varieties of the northern black-ware, what had begun as accidental disfigurement had been seized and utilized by the craftsman, and developed into an intentional technique. Virchow[3] still thought that well-regulated use of the mere smoke of an open fire would suffice to produce the effect. Dr. Landerer[4] suggested that the surface of the pots had been smeared with lamp-black, which was rubbed into the clay till it hardened and took a polish: and Dr. Hostmann,[5] somewhat later, that the pots had been anointed before firing with resin or pitch, which had soaked into the wall of the vessel, and then had been charred *in situ*; others, that whether by accident or design, carbonizable matter was present in the clay itself; for the grey or black tint went often right through the thickness of the pot-wall. That the colouring matter was carbonaceous, and of vegetable origin, seemed to be proved by Mr. Doulton's experiment of exposing potsherds from Hissarlik I. to a bright red heat, whereupon they turned to a clear yellow or red.[1]

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[1] See especially Petrie. *Naqada and Ballas*, 1896.

[2] Schliemann. *Ilios*, p. 119–20.

[3] Virchow in Schliemann, *Ilios*, l.c.: cf. *Abh. Berl. Akad.*, 1882, p. 51.

[4] Landerer in Schliemann, *Ilios*, l.c.: cf. *Trojanische Alterthümer.* Einleitung, p. xlix.

[5] Hostmann in Schliemann, *Troja*, p. 33.

But with further investigation of the black-polished varieties of the Cypriote red-ware, and, still more, of the "black-topped" red-ware of Ballas and Naqada, an alternative explanation emerged[2]; namely, that just as the red-polished fabric itself owed its brilliant tint to the presence of copious ferric oxide in the slip or clay, so the dense black—often lustrous and even metal-like on the surface—might well be due to accidental or even intentional deoxidization of the ferric oxide, by insufficiency of the air-supply during the firing: and here too experiment has shown how easily the red and the black oxides are convertible into one another; and this in a perfectly clear fire, when smoke-stain is out of the question. When, therefore, Dr. Koerte found parti-coloured red and black pots in the Boz-uyuk tumulus, so shortly after the publication of Flinders Petrie's *Naqada and Ballas*, it seemed for the moment highly probable that the black-ware of Hissarlik I. also belonged to the ferric oxide group, though Dr. Koerte himself has a passage which suggests that he did not quite understand the technique of the Naqada ware which he had seen.[3]

More recently, however, two circumstances have tended to rehabilitate the carbonization theory, and in particular Schliemann's original version of the process. On the one hand, a good modern instance survives, in a very primitive pot fabric in Borneo,[4] of exactly such a method of blackening pots with a vegetable fluid, which carbonizes within the porous clay, and produces just such an arrangement of colour-zones as is characteristic of the pottery of Hissarlik I. On the other, there was always the improbability *à priori* that, if the black-ware of Hissarlik I. were due solely or mainly to ferrous oxide, it should never have happened that a potter's fire should have given the red ferric oxide, even accidentally; especially seeing how difficult even the expert potters of Corinth and Athens found it, to ensure proper regulation of their furnace draught. It seemed worth while, therefore, to repeat Mr. Doulton's experiment and carry it further, with the result that while, as we have seen, it is possible in the case of Cypriote or Egyptian black-and-red ware, after transmuting black into red, to transmute the red back again into black, in the case of the Hellespontine black-ware the second experiment tends to fail; the black has, in fact, been burnt right out of the clay. Moreover, only in the cases where the clay is actually very ferruginous does any great redness supervene in the first experiment; the majority of the sherds turn merely pink, yellow or pale.

The minor difference of interpretation between Virchow and Schliemann, as to the method by which the carbonaceous matter was introduced into the clay, cannot be settled easily; but fortunately is of minor importance. The essential conclusion is that the black-ware of Hissarlik I. and (as we shall see) of the whole Hellespontine region, is *not* a mere local modification of a red-ware process, but is a totally different technique; a technique, moreover, which results from a very intelligible attempt to make the best of a bad job, namely, of a sullen smoky fire —appropriate therefore to northerly rather than to Levantine latitudes—and not from an expert knowledge of such conditions of furnace management as should preclude the formation of ferric oxide, over a long series of firings.

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[1] *Ilios*, 119. *Troja* 33: cf. Schmidt in *Troja u. Ilion*, 245–6.

[2] Petrie. *Naqada and Ballas*, p. 12, 36–7.

[3] Koerte. *Mitth. Ath.*, xxiv, 24.

[4] *Man*, 1901, 78. In that article I gave the locality, wrongly, as "Torres Strait." This is corrected to "Borneo" by Dr. Haddon, in *Man*, 1901, 95.

The consideration already noted, that the difficulty of the sullen fire would be likely to be more serious in a damp and northerly than in a dry and southerly climate, is in close correspondence with the actual distribution of black-faced pot fabrics. On the continent of Europe, these are the exception rather than the rule, in spite of the great abundance of ferruginous clays like those of our modern bricks, tiles, and flower-pots. The exceptions, moreover—those at all events which mount back beyond the Early Iron Age[1]—cluster in a suggestive way

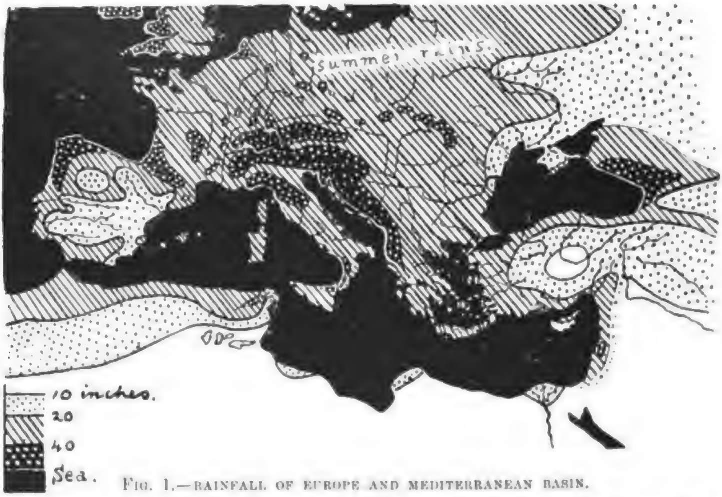

FIG. 1.—RAINFALL OF EUROPE AND MEDITERRANEAN BASIN.

[For comparison with Fig. 2, *Distribution of Black-faced and Red-faced Pot Fabrics.* Note, in addition, that the effects of the rainfall are intensified in the drainage area of the Baltic and the North Sea by two circumstances :—(*a*) the rainfall is partly a *summer* rainfall, *i.e.*, there is no long rainless season, such as there is in the Mediterranean basin; (*b*) this area was formerly almost continuous *forest*, of which many traces remain; *i.e.*, before the forest was cleared, the rainfall was probably much larger than is indicated here. Contrast the Phrygian Plateau, which (with its dry summer) was proverbially *axylos*, "woodless," in Hellenic times. Herodotus, for example, knows Phrygia as a great grazing-country (sheep farms) in the fifth century B.C. (V, 49, cf. p. 48 below).]

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[1] I omit, here also, such Early Iron Age black-wares as the rare bucchero-fabrics of Cyprus and Rhodes; just as I omit, on the other side, the red bucchero of Falerii, and the still later "Aretine" series.

round the Balkan Peninsula. Conversely, if we pass beyond Hissarlik eastward and southward into Asia Minor, the area, over which black-faced fabrics occur at all, is closely restricted, and very well defined.

It is only the distribution in the Ægean area and in Asia Minor, which concerns us at the moment. All Thrace and Macedon, so far as they are explored, are unanimous exponents of black-ware. At Hissarlik, black-ware has unquestioned supremacy in the first city; it is challenged by red-ware in the second, and succumbs in this and the succeeding settlements, though never wholly; but it revives in the sixth and seventh in two series of fresh forms: the hand-made *Buckelkeramik* of the new Schliemann Catalogue, which is likewise of European types, and is hardly represented otherwise in Asia Minor;[1] and the series of wheel-made forms with copious ornament in geometrical style and impressed technique,[2] which eventually go on to make touch with the Hellenic bucchero of Æolis. The Troad tumuli confirm the evidence from Hissarlik; and a small pot with incised zig-zigs, from Bighaditch in the upper Macestus valley, is in the Ashmolean Museum.

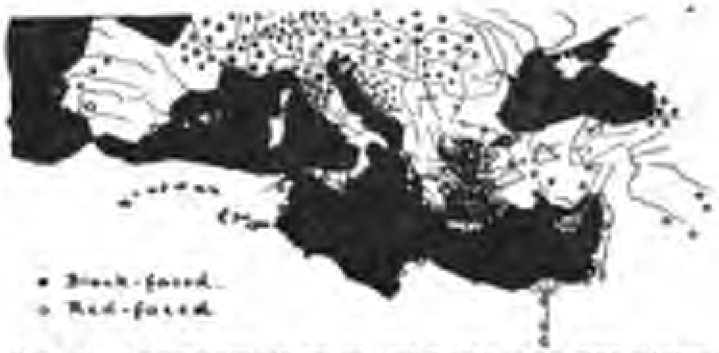

FIG. 2.—DISTRIBUTION OF BLACK-FACED AND RED-FACED POT FABRICS.

Next eastward comes the black-faced pottery of the Boz-uyuk tumulus,[3] closely akin to the fabrics of Hissarlik II–V, but distinguished by inadequate carbonization, and by a carelessness about the regulation of the firing which Dr. Koerte takes to be intentional, and which may well betray contamination with the red-ware technique which had already reached the Hellespontine area under the *régime* of Hissarlik II.

From the Midas City, again, comes a well-defined type of sherds which are indistinguishable from those of Hissarlik I; from GORDION a rude mug, with the punctuated lines between incised zigzags which occur so markedly at Hissarlik; and from LAGANIA (*Bey-bazar*) a little to the north, a very characteristic vase of a common Hellespontine form.[4]

Further south, we find a vase from ICONIUM, and fragments from IPSUS

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[1] *Heinrich Schliemann's Sammlung Trojanischer Alterthümer, beschrieben von Hubert Schmidt.* Berlin, 1902 (hereinafter Schmidt, *Schliemann-Sammlung*). The *Buckelkeramik* stands under Nos. 3565–3647, and is described on p. 172 ff.: cf. Gotz in *Troja u. Ilion* p. 300 ff.

[2] Schmidt. *Schliemann-Sammlung.* Nos. 2797–3367; 3931–3950.

[3] Koerte. *Mitt. Ath.*, xxiv, 1 ff.

[4] The sherds from the Midas City (and all others mentioned below without other reference) are in the Ashmolean Museum; the examples from Gordion, Lagania, Iconium and Ipsus are quoted by Dr. Koerte, *l.c.* Here and henceforward ancient names of sites, where they are known, are given in SMALL CAPITALS, the equivalent modern names in *italics.*

(*Tchai*); and from the hinterland of ADALIA the fine little figurine which I published in *J.A.I.* xxx, 251 (Plate XXIV).

Further east, fresh sherds from *Boghaz-keui*, *Marsovan*, and *Zille*, sites east of the Halys, enable me to correct a premature generalization on which I ventured when I published the figurine from Adalia,[1] and to extend the area of black-ware into Cappadocia and Pontus; and M. Chantre's description of *poterie noire et vernie* at *Orta-uyuk* (*Orta Eyuk*) near Dedik, between Yuzgat and Kaisarieh, send its limits south-eastwards also towards the upper crossing of the Halys. Of the colour of the pottery which he figures[2] from the neolithic site at *Fraktin*, east of Turik, in valley of the CARMELAS, the great western tributary of the Cilician river SARUS, he gives unfortunately no data, but Mr. Anderson acquired a rude *schnabelkanne* of black-ware, with primitive "string-holes," near *Bulghar Ma'aden* in the Taurus; now in the Ashmolean Museum. What we want next, in fact, is a

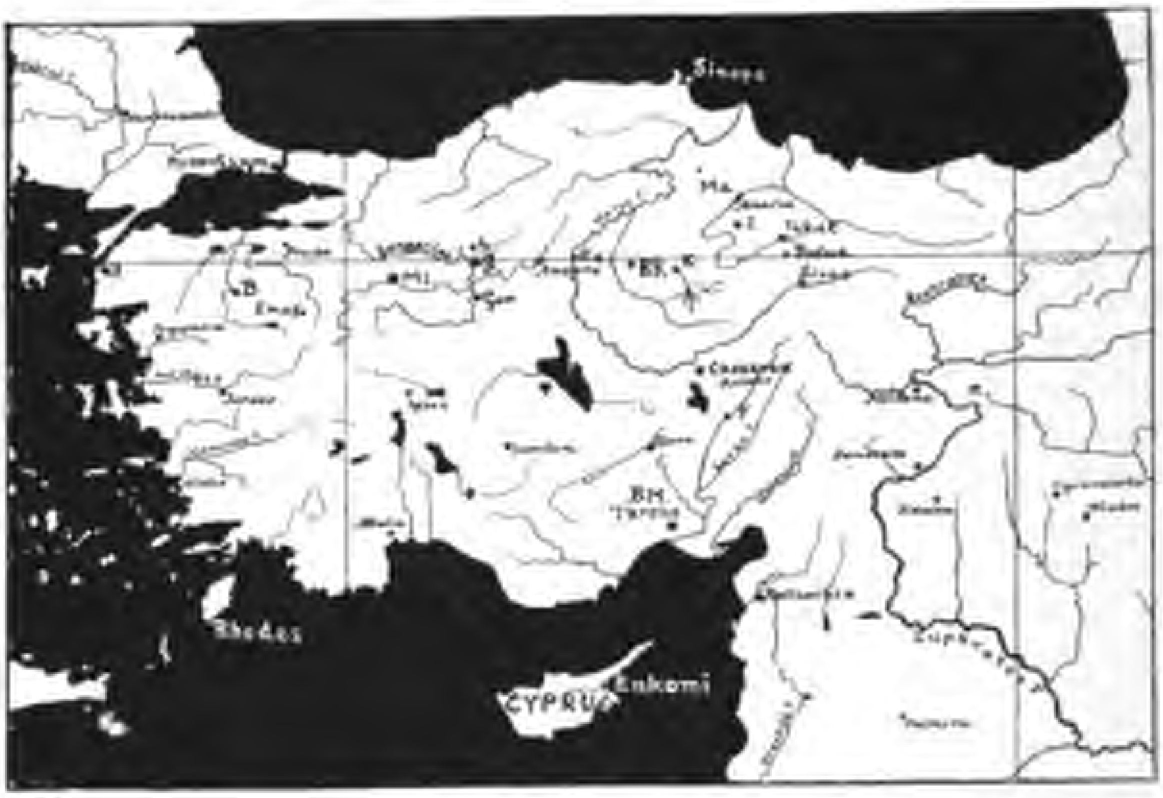

FIG. 3.—SKETCH-MAP OF ASIA MINOR.

The following sites are denoted by abbreviations :—

B = *Bighaditch.*
BK = *Boghaz-keui.*
BM = *Bulghar Ma'aden.*
Ec = ECCOBRIGA (*Kurak-kale*).
F = *Fraktin.*
Gor = GORDION.
H = *Hissarlik.*
K = *Keshne.*
L = LAGINA.
Ma = *Marsovan.*
Mi = *Midas-City.*
S = SYKEON (*Sarilar*).
T = *Terzili.*
Z = ZELA (*Zille*).

Oreudjik (not marked) is a little south of ANCYRA (*Angora*).
PAPIRA (*Balik-koyunji*; not marked) is between ANCYRA and GORDION.
Turkhal (not marked) is between *Tokat* and *Zille*.

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[1] *L.c.*, p. 255.

[2] *L.c.*, Fig. 93-6.

handful of typical fragments from one or more of the ancient sites which mark the passes of Taurus.

As to the persistence of black-ware tradition within this area, two data are instructive. From Emed in Western Phrygia comes an isolated vase (Fig. 4) of a form, and in a technique, which recalls the later settlements at Hissarlik when Ægean and Cypriote influences begin to be perceptible more clearly; but in addition to its grey (not black) coloration, it has a simple skeuomorphic ornamentation of grouped lines painted in white, of a kind which exactly recalls that of a most characteristic type of Bronze Age pottery[1] which invades Cyprus and Egypt simultaneously about the time of the eighteenth Dynasty, and the Ægean colonization of the Levant; but which is wholly foreign to the Ægean, and at the same time nearly related to a large, ancient, and persistent group of fabrics on the Syrian coast: in which latter area it is probably at home. No such use of white paint in skeuomorphic art occurs at Hissarlik or further west, though one fragment of an allied Levantine fabric was found at Hissarlik. In the museum of Zurich, however, there is an isolated example "from Hungary" of the Levantine prototype of our Phrygian skeuomorph, an actual import from the centre of the fabric; but I have not been able to trace its history more exactly.[2] Here then we have probably an intrusion into the heart of Asia Minor of a maritime Levantine fabric, at a comparatively late period in the Bronze Age; and the contribution which it makes to the ceramic art of Phrygia is the use of white paint on a dark ground. Its contribution to our present argument is that it permits us to assign this vase from Western Phrygia to a date not earlier than the middle of the second millennium B.C.

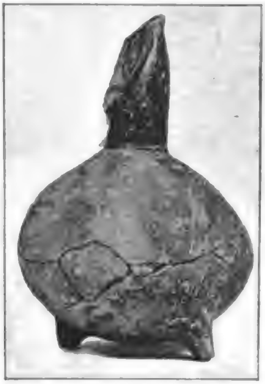

FIG. 4.—VASE FROM EMED.
Slate-grey clay with white-painted ornament.

The other supplementary datum is the occurrence at the Midas City, at Gordion, and at Marsovan, of slate-grey[3] fabrics, sometimes wheel-made, with ribbed and impressed ornamentation[4] such as are characteristic of Hissarlik VII and the sub-Mycenæan period in the Hellespont. This greatly extends the area over which the black-ware element must be regarded as having been reinforced in the period which succeeds the downfall of the Mycenæan outpost in Hissarlik VI.

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[1] The "Base-Ring Ware" of the *Cyprus Museum Catalogue*, p. 37, Nos. 251–277; especially 271–277; and reff. *ad loc.*

[2] For further discussion of this group of fabrics see below, p. 395–6.

[3] I use "slate-grey" to translate the *silbergrau* of Dr. Koerte. *Mitth. Ath.*, xxiv, p. 25.

[4] Compare the grey fragments, with impressed ornament, from Cappadocia: Chantre, *Mission Archéologique en Cappadoce.* Pl. III, 10, 12 (Boghaz-keui).

The Red-Faced Fabric of Hissarlik II and its Homologues.

The same series of surface explorations, which has so greatly extended our knowledge of the black-ware *régime* in Asia Minor, has also added many details to our conception of the origin of the red-ware which intrudes upon its domain in Hissarlik II.

At Boz-uyuk, as we have seen (p. 369), Dr. Koerte had observed a certain preference for a parti-coloured treatment of the surface of the pots; but the ambiguity, at that time, of the evidence as to the relation of black to red, and also his own preoccupation with the Thrako-Phrygian aspect of the problem, conspired to prevent him from appreciating the significance of any red-ware evidence which may have passed under his eyes; at the Midas City for example. For not only on that site, but also at Marsovan, Boghaz-keui, and Kara-uyuk, and in fact on every site, in Phrygia or Cappadocia, from which as much as a handful of potsherds has reached me,[1] a well-marked hand-made fabric of red-polished ware seems to be represented. Whole vases, whenever they occur, from Boghaz-keui,[2] Kara-uyuk,[3] and Sarilar[4] (Sykeon) on the Sangarius (Fig. 5) present a series of forms which betray close analogies, on the one hand with the fully developed red-ware of Cyprus, on the other with that of Hissarlik: and confirm the conclusions already put forward by successive observers, by supplying intermediate links, along an overland route between these foci of the fabric. Yet another intermediate link is supplied by fragments, in Mr. Cecil Smith's collection, from *Balik-koyunji* (Papira), which is the first halting-place west of Angora on the great road towards Gordium and the west. They include one with a handle like those which characterize Hissarlik III–V; and one which has incised ornament, and shows the black ferrous-oxide variant. Two other fragments with a sort of "comb-face," in the same collection, one without locality, the other, Fig. 6, labelled *Orendjik* (a little south of Angora), show stages analogous to fabrics from Hissarlik VII; and a fragment from *Kuruk-kale* (Eccobriga) on

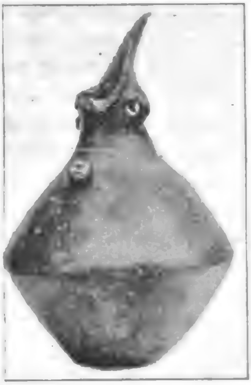

Fig. 5.—Vase from Sarilar.

Red-polished clay; no ornament, either painted or incised: cf. J.H.S. xix, 35, Fig. 2.

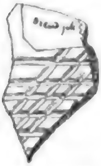

Fig. 6.—Vase from Orendjik.

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[1] Compare Mr. Crowfoot's observations and list of sites, *J.H.S.* xix, p. 38.

[2] Chantre. *Mission Archéologique en Cappadoce*, Pl. V.

[3] Chantre. *Mission Archéologique en Cappadoce*, Pl. VIII.

[4] Ashmolean Museum; found by Messrs. Anderson and Crowfoot; with it was a rude stone figure of the same type as the "owl-faced idols" of Hissarlik II–V, but larger (*J.H.S.* xix, 34–5, Fig. 1).

the Halys, between Angora and Boghaz-keui betrays, in its interior, a survival of the same technique (see p. 379, § 7).

In the meanwhile, also, the evidence for the non-Ægean origin of the red-polished style has been accumulating steadily. On the mainland of Greece, it never had firm hold at all: such fabrics as occur are either careless and rough, or have every indication of comparatively late date. In Crete, so far as the neolithic layer at Knossos has been investigated as yet, no definitely red-ware technique seems to have been contemplated intentionally at all: when there was much iron in the clay, there was risk of a red surface;[1] when the fire was sullen, there were smoke-stains; and for the most part the wares are of tints of drab and brown. The island, in fact, was sufficiently remote from continental influences on either hand, to pursue an independent course of its own until it had already made acquaintance with pigment, which seems to have happened very early.[2]

The summary given in the preceding paragraph represents the result of my own examination of the contents of a single trial-shaft at Knossos, which Dr. Evans most kindly allowed me to look through in April, 1903. Dr. Mackenzie, however, with much closer acquaintance with the whole available material, detects a distinct inclination towards a black-ware technique, which becomes more marked later, and preludes the black-glazed white-painted fabrics of the Minoan Age.[3] If these conclusions are confirmed—as there is every reason to expect that they will be —by further examination of the vast neolithic deposit at Knossos, Crete will fill, here also, the *rôle* to which its geographical position entitles it, and which it has so often filled since, of South Ægean receptacle and refuge for samples of anything which for the moment is dominant on the European side of the Hellespont. And in any case Dr. Mackenzie's observations, and my own, agree as to the absence of anything like a regular red-polished fabric at Knossos.

In Melos, on the other hand, the only one of the central islands where a stratified deposit has been examined as yet, the red and the black are both intruders simultaneously into an area of mud-coloured fabrics—the "Pelos" type— with distinctive forms and ornaments of their own: the red, when it comes, being magnificent in quality, but translated invariably into native Cycladic forms: the black, on the other hand, being for the most part already attenuated to an anticipation of the grey tints of Phrygia and of the sub-Mycenæan Troad.[4] The single red-smeared bowl from the prehistoric settlement at Thera[1] falls into the same category as the Melian examples; in Amorgos the red-ware seems to intrude immediately upon the mud-coloured wares; and in Siphnos, Syra, Despotiko, and Paros,[2] the late arrival of both black and red is indicated by the advancement attained by the forms of these indigenous fabrics.[3] It is clearly not from this side, then, that we must look for the origin of the red-ware.

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[1] Dull red in the 8th and 7th metres from the surface; one sherd of quite bright red in the 6th; one in the 5th; dull red sherds, and buff sherds in the 4th; rather more red, and much buff, in the 3rd. Fine black, on the other hand, in the 7th, and dull black throughout.

[2] For a suggestion as to the relation in which the Minoan white-on-black technique may stand to the white-on-black fabrics of the Levant, see p. 393 *n*, below.

[3] *J.H.S.*, xxiii, 158–162. At the bottom "all the fragments have a sooty grey imperfectly sifted clay" (p. 158); the polished surface "becomes more and more uniformly black as time goes on" (p. 160); and quite "near the end of the neolithic series," we have a cup "remarkable for the careful levigation of its grey coloured clay, its thinness of section, and the brilliant almost glaze-like lustre of its fine black hand-polished surface" (p. 160).

[4] For Melos, see the *Annual of the British School of Archæology in Athens* (hereinafter *B.S.A.*) iii. iv. v., and the British School's *Excavations at Phylakopi.* (Macmillan, 1904.)

Is Cyprus, however, as has been commonly supposed,[4] the ultimate focus of the red-polished technique? Appearances at present are against it. In Cyprus, as in Melos, the technique intervenes full-grown, in an insulated area which, with one or two doubtful exceptions, has no previous ceramic at all: and the forms which the fabric assumes, in the earliest necropoleis which can be traced, are just those which would be in use among a people who had not the ceramic art at all, namely, those of gourds and skins, with accessories in wood and basketry.[5]

On the Syrian coast, on the other hand, besides counterparts of the Cypriote series, which here seem to belong to a somewhat later stage, we have the long series of "wavy-handled" and "comb-faced" pottery, in the earliest strata of Lachish or Gezer for example, with their notable affinities of form as well as of technique to the later stages of the red-ware in pre-dynastic Egypt.[6]

Here, then, in Egypt, probably, in a country of ferruginous soil and dry climate, we have probably to place the origin of the red-polished technique; for here alone do the earlier forms go back to mere mud-pie archetypes. Here it borrowed by degrees, and transmitted to the Syrian area, details derived from the contemporary stone-vase industry at home, and more rarely from the repertoire of gourds and skins: and meanwhile it was spreading homologous fabrics westward across Libya to Tripoli, Tunis, and Malta[7]; and probably laying also, far afield, a red-ware foundation for the painted fabrics of Kabylia and neolithic Sicily.[1]

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[1] Preserved with other objects from Fouquet's exploration of Thera, in the Library of the French School in Athens.

[2] For Amorgos, see Dümmler, *Mitth. Ath.*, 1886, p. 17 ff.; for Siphnos, Pollak, *Mitth. Ath.*, 1896, p. 210 ff.; for Siphnos and Syra, Tsountas 'Εφ. 'Αρχ. 1899, p. 73 ff.; for Paros, Antiparos, and Despotiko, Tsountas 'Εφ. 'Αρχ. 1898, p. 137 ff.

[3] In Antiparos, however, smoke blackening was noted, in vases of "Pelos"-type, by Bent, *J.H.S.*, v, p. 54; but his specimens, in the British Museum, support the generalization in the text.

[4] *E.g.* by Ohnefalsch-Richter (*Verh. Berl. Anthr. Ges.* 1899, p. 39 ff.). In the *Cyprus Museum Catalogue*, p. 16–17 (which was in type about 1896, though not published till 1899) we accepted Petrie's original (and much later) dating for the culture of Naqada and Ballas; and consequently were restrained from the inference which is permitted by a pre-Dynastic date on the Egyptian side.

[5] *E.g.*, Ohnefalsch-Richter, *Kypros, the Bible, and Homer* (hereinafter *K.B.H.*), Pl. XXXIV V. *Verh. Berl. Anthr. Ges.*, 1891, p. 34 ff. (skeuomorphs). Compare *Cypr. Mus. Cat.* (hereinafter *C.M.C.*), p. 14–16, and Furtwängler's comment on the Cypriote red-ware, *Antike Gemmen.*, iii, 22.

[6] Petrie, *Tell-el-Hesy*, Pl. V, VI. Bliss and Macalister, *Excavations in Palestine*, Pl. 27.

[7] Myres. *Man*, 1901, 71. I am well aware that the only *modern* hand-made fabric of the neighbourhood of Lebda in Tripoli is smoke-stained and almost black; but I think that this abnormality is sufficiently explained by the rain-map in Fig. 1; especially as a comparatively slight rainfall, locally, within an area of otherwise emphatic drought and of retrograde culture might be expected to disconcert the potter more than a comparatively heavy rainfall on the

In Asia Minor, on the other hand, the pot-forms of the red-ware are closely akin to the Cypriote series, and show no great resemblance to the older mainland types of Southern Syria. This peculiar distribution of affinities needs explanation; and finds it, I think, partly in the proximity of Cyprus to the Cilician coast-land and the Gates of the Taurus; but chiefly in the circumstance, from which this inquiry began, that the particular types of copper implements which Cyprus seems to have derived, like its red-ware technique, from the culture-area of Naqada and Ballas, are the types which spread so persistently across Asia Minor to Hissarlik, to the exclusion of other types which, though represented in prehistoric Egypt, are absent from the Cypriote repertoire. By a fresh line of argument, therefore, we arrive once more at the old conclusion as to the significance of Cyprus, and its copper-supply, in the nascent industry and trade-system of the Nearer East.

THE PAINTED STYLE OF CAPPADOCIA.

We pass now to our third problem of the occurrence of a painted ceramic in the heart of Cappadocia.[2] Let us first summarize the evidence (see map, Fig. 3, p. 372).

1. At *Boghaz-keui*, and more copiously at *Kara-uyuk*, M. Chantre found a large series of vase-fragments, and at Kara-uyuk one or two whole vases, which bore painted decoration; some, on the buff surface of their own clay; but the majority, on a more or less thick and chalky slip, creamy or dead white, of a different kind of clay from that of the substance of the vase. The pigments were two; a lustreless umber, like the black *matt-malerei* of Cyprus and the Cycladic phase of Ægean culture; and a warm plum-coloured red, which though sometimes used in the same manner as the black, and interchangeably with it, is often also laid on, as its chalky texture tended to demand, in broader zones or patches; and frequently, as a subsequent filling, for spaces which are defined by outlines of the black. The ornamentation is almost wholly geometrical, in varying degrees of complexity; and with frequent employment of concentric circles, apparently compass-drawn. In rare instances, however, spiral ornament, and figures of quadrupeds occur; the latter within a panelled composition which is otherwise purely geometrical.[3]

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margin of an aggressive and relatively superior culture, as in Syria, and in the Hellespontine region.

[1] Myres. *J.A.I.*, xxxii, 248 f.

[2] I have used the word Cappadocia in a somewhat extended sense, to include the whole of the eastern half of the Anatolian plateau, whether north or south of the upper course of the Halys. This is the fifth century usage (Hdt. v. 49); the later restriction of the term is due, of course, to the creation of a "Galatia" on the site of old "Phrygia," and beyond it also, by the Gallic raids of the third century B.C.

[3] Chantre. *Mission Archéologique en Cappadoce*, Plates I–V (Boghaz-keui); VI–XIV (Kara-uyuk).

2. From IDRIAS-STRATONICEIA in Caria comes a large fragment in very similar fabric and style, with geometrical ornament in black and red enclosing a panel in which is a rudely drawn quadruped, of ferocious aspect, and somewhat more infantile handling than the horned animal from Kara-uyuk (Perrot-Chipiez, v. Fig. 231–3).

3. The editor of the new Catalogue of the Schliemann Collection notes, under No. 3771A, a considerable number (70 in all) of sherds of unfamiliar painted styles which he sets aside vaguely as *kleinasiatisch*.[1] These should certainly be looked through again, in the light of the other material now available.

The subsequent journeys of the British explorers already quoted have added somewhat to the information collected by M. Chantre.

4. From *Kara-uyuk* Mr. Crowfoot obtained some further sherds, which add—

(*a*) Variants of the geometrical patterns already recorded by M. Chantre.

(*b*) A remarkable representation of birds; in black paint only and in a style still mainly geometrical; Fig. 10, p. 385.

(*c*) Another representation of a long-legged bird, rudely naturalistic, with the black outline filled in with the purple-red; Fig. 9, p. 385. The *human* legs of this bird will surprise no one who is familiar with the makeshifts of savage art. This bird Mr. Crowfoot describes as an "ostrich." He notes that "the ostrich occurs frequently on Vannic cylinders"; and that the panel filling of No. 11 (cf. Chantre, Pl. XI, 1) suggests the ornamentation of the Vannic metal-work in Berlin; and concludes for a strong Vannic or proto-Armenian influence in Cappadocia. Subsequent phases in the history of Cappadocia show that this analysis has much in its favour; what is wanting, to confirm it, is some Vannic pottery.

(*d*) A noteworthy rim (Pl. XXXIX, 3, 4), in a chalky dead-white slip, painted geometrically with dilute black and red; a recumbent animal (cow or goat, for it "cleaves the hoof"; the head is missing) is modelled, in the round, on its edge.

5. From another *uyuk* or mound-site beside the village of *Kara-yakub*, a quarter of an hour east of Terzili,[2] Mr. Anderson secured two more pieces in a similar style (Nos. 10, 16).

6. From the *Hammam* or hot springs 1½ miles east of *Keuhne*, near the site of MITHRADATEION on the borderland between Galatia, Cappadocia, and Pontus,[3]

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[1] Schmidt. *Schliemann-Sammlung*, p. 186, "70 Bruchstücke meist alterer Art, bemalt mit einfachen Firniss-streifen (kleinasiatisch ?)."

[2] Terzili lies on the Kanak-Su, a tributary of the Delidje Irmak (anc. KAPPADOX R.)

[3] Keuhne (*Geune*, wrongly, in older maps) lies about 20 miles E. of Yuzgat, in the upper fork of the side-stream which joins the Kanak-Su below Terzili about 20 miles S.S.E. The neighbouring site of MITHRADATEION (=EUAGINA=VERINOPOLIS; Strabo 567) lay in the S.E. corner of Mithradates' kingdom, and was detached from Pontus by Pompey and given to Galatia.

comes the terracotta horseman (Pl. XXXIX, 1, 2), also secured by Mr. Anderson. It is in the same slip and has the same painted geometrical ornamentation as the best pottery from Kara-uyuk and Bolus.

7. From *Kuruk-kale* (Eccobriga), on the eastern bank of the Halys, close to the great crossing between Boghaz-keui and Angora, Mr. Cecil Smith's collection contains fragments with similar painted geometrical ornaments.[1] Among the fabrics are red-and-black-on-buff, and black-on-white, with red-polished interior. That in later times, at all events, the trichrome painted fabric of Boghaz-keui extended also beyond the Halys westward, is clear from the fragment from Orsologia, to be noted below, § 13.

8. From a new site noted by Mr. Anderson in the mound beside the village of *Bolus*, between Tokat and Sivas,[2] comes another remarkable series, including variants of many of the geometrical ornaments from Kara-uyuk and the other sites already mentioned; Nos. 2–6, 8, 11–15, 17, 20, 21, 23, 24.

9. From *Zille* (Zela), south of Amaseia and south-west of Turkhal, Mr. Cecil Smith has similar painted geometrical fragments (Nos. 1 and 7, both closely repeating characteristic motives from Bolus). To his collection belongs also the black-ware fragment from Zille, quoted on p. 372.

10. From *Turkhal* (Gazioura-Ibora) itself, Mr. Anderson obtained fragments "showing concentric circles in brown or purple on a red or buff ground, triangular hatchwork in purple on a red ground, a mæander pattern on a light grey slip," etc.; compare his note on the matter in *Studia Pontica*, I. s.v. *Turkhal*. These fragments were unfortunately lost afterwards *en route*, but Mr. Welch, who collected some of them, remembers them as "of the geometric Cypriote type." The mæander is unique from this area hitherto, unless it was really part of a motive like the panel-filling of No. 11 from Bolus, and like Chantre, Pl. XI, 1.

11. From *Hormuzd-uyuk*, the exact whereabouts of which I have not been able to ascertain, Mr. Cecil Smith's collection contains a fragment, with red-framed panel on white slip, which closely resembles Nos. 12, 13, from Bolus.

12. From Sargon's palace at Kouyounjik in Assyria comes the series of closely similar fragments of which some are figured and described by Perrot-Chipiez, *Hist. de l'Art*, ii, fig. 372–9. They give some clue, as we shall see, as to the date, range, and importance of these fabrics; and will be discussed in detail further on (p. 392, cf. Pl. XLII).

13. Finally, both at Boghaz-keui, and at Marsovan (further north, and still

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[1] One of these (No. 19, lower half) has been already published by Mr. Crowfoot, *J.H.S.*, xix, p 39, Fig. 3: another is his fragment γ (*l.c.*, p. 39); No. 9 seems to be his fragment δ (*l.c.*).

[2] Bolus represents the Βόρυζα, πόλις Ποντική. Steph. Byz.; the Verisa of the Antonine Itinerary and Christian documents. "The ancient town was evidently built largely of sun-dried bricks: the mound is of a soft loamy soil, thickly strewn with potsherds and bones of all sorts, as may be seen from the escarpments made by the villagers to obtain back walls for their huts. The fragments of pottery were found partially protruding from the escarpment or lying about at the foot." For this and other topographical details in regard to these sites, I am indebted to my friend Mr. Anderson.

east of the river Halys)[1] Mr. Munro has identified a new trichrome fabric, unrecorded by M. Chantre, which is wheel-made, and of a quite distinct decorative scheme: the bright salmon-red clay, of fine texture and compact surface, being ornamented directly with simple wheel-worked bands of black, purple-red, and dense-white. The latter pigment has very much the same appearance as the material of the densest white slip (Pl. XXXIX, 3, 4) from Bolus, but in the best examples has almost the appearance of a glaze.[2] Mr. Cecil Smith has a fragment of the same ware from Orsologia, west of the Halys, and about 30 miles south of Angora; a less characteristic fragment (in a good buff clay, but without paint) from Papira; and another from Zille.

Distribution.—The significance of this distribution will be seen from the geographical relations of the sites. The ancient road system of the Anatolian plateau is based upon the existence of two great foci of convergent traffic; *Kaesarieh* (Cæsarea-Mazaca)—or, more exactly, *Kara-uyuk*—and *Boghaz-keui*, the ancient Pteria, and the political centre, probably, of early Cappadocia.

On Kaesarieh the routes converge from Malatia, and the Euphrates-passage to the east; from Tarsus and the Cilician Gates to the south; and from Karaman and Konia to the south-west. Westward traffic is barred by the Tuz-Geul marsh and the Axylon steppe from Konia to the middle course of the Halys (*Kizil Irmak*); and westward-bound goods went consequently, north to Boghaz-keui, and crossed the Halys at *Kuruk-kale* (Eccobriga), between Boghaz-keui and Angora.

On Boghaz-keui, similarly, converged the eastward road from Sivas and Armenia; the northward road, *viâ* Alaja and Chorum to Marsovan and Sinope (*Sinub*); and later, diverging north-west, to Amisus (*Samsun*), and the multiple westward routes which cross the Halys and ramify at Angora.

Between Boghaz-keui and Kaesarieh, therefore, lay a great artery of traffic, along which passed the whole through-trade; both east-and-west from the Euphrates and Mesopotamia to the Hellespont and the Ægean; and also north-and-south, from the Pontic ports to the Cilician foreshore and the Syrian coast. Now both Terzili (Kara-yakub) and Keuhne lie right on this main road; and Keuhne lies also at the point where it receives the cross-road from Sivas to Boghaz-keui and the west. Marsovan, as we have seen, lies on the main north-road from Boghaz-keui to Samsun; Bolus, on another great road, which goes marginally north-westward from Sivas *viâ* Tokat (where the road diverged from Comana and Neocæsarea), *Turkhal* (Gazioura-Ibora), and Amaseia to the coast at Samsun; and Zille, finally lies on an alternative route from Sivas to Amaseia, which diverges westward at Bolus, and returns northward at *Sulu-serai* (CARANA-SEBASTOPOLIS).

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[1] The locality Marsovan represents several neighbouring sites. Mr. Munro tells me that the American Mission in Marsovan possesses an interesting collection of fragments from these sites, and it is much to be desired that these also may be made accessible by publication before long.

[2] The nearest parallel is a Hellenic fabric of Mytilene, of which there are fragments in the British Museum (Vase Room A), which has a very similar ground-colour, and three-fold pigment. Mr. Welch, whose collection from Boghaz-keui was afterwards lost, remembered it as "mostly late glazed" ware. It is probably to a fragment of this fabric that Mr. Crowfoot refers when he speaks of a "Naukratite" piece from *Derekeui Kale* near *Giaour-Kalesi*. *J.H.S.* xix, p. 39, compare p. 28 *n* below.

Now the ceramic of places which lay on great lines of traffic is not likely to have lagged behind the main current of culture on the plateau; and the close similarity between the painted fabrics, at points so distant as Bolus, Kuruk-kale, and Kara-uyuk, increases the probability that we may regard the extant series, small as it is, as typical of a widespread Cappadocian style with well-defined characteristics, and probably of long-continued vogue.

Fabrics.—With the exception of the wheel-made plates and bowls from Boghaz-keui and Marsovan, the Cappadocian fragments seem to be all of hand-made fabric. All, also, except the red-clay fragment from Kara-uyuk (No. 3), are of coarse unlevigated clay, and owe their paintable surface to a coating, more or less thick, of a dense chalky texture, and a different composition from that of the body of the vessel.

The wheel-made fabrics belong in every way to a distinct phase of culture, and betray marginal Hellenic influence; and this conclusion is fully borne out, as we shall see, by their form and their ornaments.

Forms.—Of the forms, very little can be said as yet; since the fragments which are accessible are too small to give much idea of the shape of the vessels to which they belonged. There appear in Chantre, Pl. V, a large globular *schnabelkanne* akin to the later Trojan types (Hissarlik II–V) and a *pithos* which recalls the contour of fragments from Hissarlik V–VI.[1] But these are both of unpainted fabrics, and need not be of at all the same date as the painted wares.[2] The three vessels in Chantre, Pl. VIII, though they bear simple painted ornament, do not give much more help: No. 1 is of a form which is common at Hissarlik from I to VI, and in Cyprus and Syria from the middle of the Bronze Age to the late Mycenæan: No. 2, clearly a copy of a wheel-made type, with a characteristic twisted handle, would range, in Cyprus or the South Ægean, from the end of the Mycenæan to the end of the early Iron Age (seventh and sixth century): No. 3, whilst its body-form suggests a wheel-made model, has no close parallel either in Cyprus or in the Ægean; neckless vases with lateral spouts are, however, common and characteristic in the Cyclades and Crete in pre-Mycenæan (Minoan) time; and the nearest parallels to its curious spout are the bronze examples from Hissarlik II–III[3]; whilst its ungainly handle is more in accord with the commoner Palestinian types of the pre-Israelite stage.[4] The bowl-handle, from Kara-uyuk, in Chantre, Pl. IX, is nearer akin to Levantine than to Ægean or even Hellespontine types.

On the other hand, the forms of the wheel-made fabrics of Boghaz-keui, and of the bowls and plates from Marsovan find their counterparts rather in Hissarlik VIII, in the "Tomb of Alyattes" and other Lydian sites, and at Samos, Kamiros, and Naukratis[1]: and consequently may come down as low as the seventh or early sixth century, though, as we shall see later on, the probability is that the wheel-made series at Marsovan begins rather earlier than this.

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[1] *Schl. Samml.* 2531–2.

[2] Compare, for example, the form of the red-ware vase from Sykeon (Fig. 5, p. 374 above).

[3] *Schl. Samml.* 5974, 6147, a b; described originally by Schliemann, *Ilios*, Fig. 796, 797, as "part of a helmet," but identified with certainty by Dr. Goetz.

[4] Bliss, *Mound of Many Cities* (hereinafter *MMC.*), Fig. 183 (Pl. 4), *Exc. Pal.* Pl. 24; 30–32.

All that results, therefore, at present, from an examination of the forms, is as follows:—

1. The forms, upon which the extant Cappadocian profiles are modelled, range over a period represented by the interval between Hissarlik II and the Minoan Age on the one hand, and Hissarlik VIII and Hellenic Ionia on the other.

2. Consequently the extant fragments themselves *may* have to be distributed over a period of this duration, unless other evidence intervenes to restrict the time-range of painted ornamentation in Cappadocia.

3. The fact that in some instances the models were wheel-made, while the extant fragments which follow them are hand-made, shows that in any case the introduction of the potter's wheel into Cappadocia occurred late in the development of the painted fabric, and apparently not much earlier than the seventh century.

4. The distribution of the wheel-made fabrics—commonest at Marsovan, less common at Boghaz-keui, and apparently rare at Kara-uyuk,—suggests that the knowledge of the wheel was introduced from the north coast; *i.e.*, from the Milesian colonies, Sinope and Amisus.

Ornament.—This last result is of importance in regard to the ornament also, for it shows that the use of paint cannot have been introduced merely along with the use of the wheel. Individual fragments, of course, may very well represent survivals of an older fabric into a wheel-using period; but the total absence of recognizable marks of any known seventh or sixth century style either in the fragments themselves, or in the objects associated with them, shows that the ceramic tradition which they represent is no recent import, but has a long history behind it in Cappadocia itself.

That this was indeed the case, and that the painted fabric has passed through several dateable phases, is shown, I think, more directly and conclusively, by the composite character of the ornament itself and by the heterogeneity of the motives which make up its repertoire.[2] Two main groups of successive accretions can be distinguished clearly, and when these are subtracted there still remains a residuum of well characterized motives, to which in turn a history and a period can be assigned. For clearness, the results of the analysis are given briefly first in chronological order:—

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[1] For the wheel-made fabrics from Hissarlik VIII–XI, see *Schl. Sammlung.* 3775 (cf. Marsovan) 3782 (cf. Boghaz-keui). For the Lydian "Tomb of Alyattes" see von Olfers, *Abh. K. Preuss. Akad. Wiss. Berlin*, 1858, p. 539 ff.; and compare the fragments from Bin-Tepe in the British Museum (Vase Room A), Cecil Smith, *Class. Rev.* I, p. 82, Perrot-Chipiez, v, Fig. 200–2. For Samos, see Boehlau, *Aus Ionischen u. Æolischen Nekropolen*, Plates V, 1, VIII, 1, 2, 3, 19; for Kamiros, see Salzmann, *Nécropole de Camiros*, and the series in Brit. Mus. A.; for Naukratis, see the Egypt Exploration Fund's Memoirs iii, vi.

[2] The extant examples are at present too fragmentary to permit extended application of the test of decorative precedence among the various motives. We may, however, apply it so far as to infer that the geometrical ornamentation of the frames of panels (on No. 11, on Chantre, Plate XI, 1), and the Idrias vases (Perrot-Chipiez, *Histoire de l'Art dans l'Antiquité*, v, fig. 231–3), represents a geometrical phase which is antecedent to the introduction of the animal-types which the panels themselves enshrine.

A. Pre-Mycenæan geometrical residuum, akin to pre-Mycenæan tradition at Hissarlik on the one hand, and in Cyprus and Palestine on the other.

B. Mycenæan accretions, few and remote.

C. Post-Mycenæan (early Iron Age) accretions, numerous and well defined, with homologues in Hissarlik VII–VIII, but most closely paralleled in the local sub-Mycenæan school of Cyprus;

after which it will be convenient to discuss, first, the accretions in detail, in reverse order; and then, in broad outline, the significance of the residuum.

C. *Post-Mycenæan Accretions.*—Of these the following are typical, and it will save repetition, to note at once their nearest counterparts in adjacent styles.

1. The simple rim ornaments of plain bands and looped lines ⏝⏝⏝ (*e.g.*, Nos. 17, 23, Chantre, Pl. VII, 3, XI, 4), especially occurring, as they do, on those forms which are most imitative of wheel-made models, offer close comparisons with the early Hellenic wheel-made fabric of Hissarlik VIII[1] and the analogous fabrics enumerated in the foregoing note (p. 382, note [3]); though the looped rim-border may of course go back further, into class A. 1 below. For the dots within the loops (No. 17) compare Chantre, Pl. X, 2, Chantre, Pl. VIII, 1.

2. The peculiarly large-meshed lattice work (Nos. 14, 15, 18) is very characteristic of the later stages (seventh to fifth centuries) of the native Cypriote styles.[2]

3. The frequent use of concentric circles (*e.g.*, Chantre, Pl. III, 1, 4, X, 1, XI, 4), either only two or three in a system (Nos. 1, 5), or more rarely in larger numbers (No. 10), is a commonplace of sub-Mycenæan ceramic, from Hissarlik,[3] throughout the Ægean, to Cyprus,[4] where their use continues on the local native fabrics down to the fifth and even to the fourth century, though their great vogue is over already in the sixth. Compare also the association of a row of concentric-circle systems, on the principal zone of the vases in Chantre, Pl. XI, 4, with a looped or wavy line, as on a large class of Early Iron Age amphoræ in Cyprus.[5]

4. The use of the "Maltese cross" ✠ as centre ornament, as in Chantre, Pl. XI, 31. This occurs freely in the miniature school of Cypriote painted ware in the Early Iron Age,[6] and in the homologous developments of sub-Mycenæan

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[1] *Schl. Samml.* 3770-1-1A.

[2] *Cyprus Museum Catalogue*, Nos. 1171–1175, British Museum, *Excavations in Cyprus*, Figs. 151^{1} (Amathus). Compare the wide-meshed zigzag, Chantre, Pl. VIII, 1.

[3] *Schl. Samml.* 3708, 3736, 3921.

[4] *Cyprus Museum Catalogue*, Index, s.v. "concentric circles."

[5] *Cyprus Museum Catalogue*, Nos. 1161–2: for the "wavy-line" alone see *CMC.* Index, s.v.

[6] *Cyprus Museum Catalogue*, Index, s.v.

tradition in the Palestinian coastland.[1] Note especially, as common to Palestine and Cappadocia, though only rare in Cyprus, the curious trick of using a different depth or tint of colour for each opposed pair of arms; and compare the two-tinted lattice on the small fragment No. 16, with *Exc. Pal.*, Pl. 38, Fig. 67.

5. The alternating billet-ornament on the neck of Chantre, Pl. XII, 4, belongs to a long and obscure series of Early Iron Age ornaments in the Ægean, which appear on the smaller wares of the geometrical, and on a large class of early "orientalizing" fabrics. It may go back to an original of the class A. 2, below.

6. The blundered imitation of an "Egyptian staff ornament" on No. 11 belongs similarly to a long series of variants among the "orientalizing" schools of Hellas.

7. The representations of birds—single, or grouped in long processional file—begin indeed in the later Mycenæan,[2] but become characteristic in the acme of the geometrical style in the Ægean, and pass on into the earlier orientalizing fabrics in that area. They occur in Hissarlik VI,[3] and single birds (though not bird-friezes) occur throughout the Early Iron Age in Cyprus, and particularly in its later stages.[4] The Palestinian sites have a well-marked local school of bird-drawing (Figs. 7, 8)—associated, as in Cappadocia, with horned quadrupeds, but not leading to bird-friezes—which seems to have a range concurrent with the Mycenæan colonization.[5]

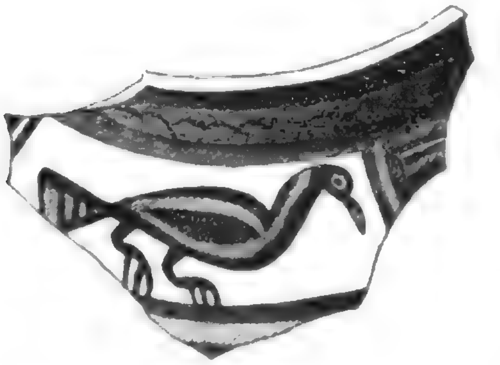

FIG. 7.—VASE-FRAGMENT FROM PALESTINE (TELL-EL-HESY).

Wheelmade, "painted in red and black on a surface covered with a browny-white-wash." Bliss, *MMC.*, p. 62, Fig. 106. (By the courtesy of the Palestine Exploration Fund.)

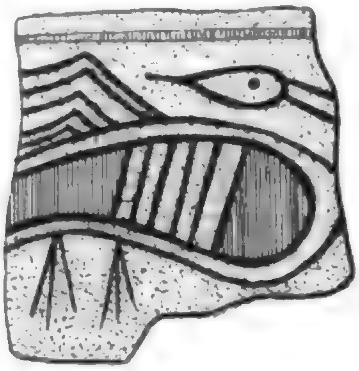

FIG. 8.—VASE-FRAGMENT FROM PALESTINE.

Wheelmade; black and red on buff; strong Mycenæan influence. Bliss and Macalister, *Excavations in Palestine*, Pl. 41, Fig. 138. (By the courtesy of the Pal. Expl. Fund.)

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[1] *Exc. Pal.* Pl. **40** (113–116); **42** (160–163); **44**.

[2] Hissarlik VI, *Schl. Samml.* 3405; British Museum (Murray and others) *Excavations in Cyprus* (passim). Furtwängler and Loeschcke, *Mykenische Vasen* (passim). Compare Evans, *A Mycenæan Treasure from Ægina, J.H.S.*, xiii, 198 ff, 206 ff.

[3] *Schl. Samml.* 3651, 3690, 3755, 3757.

[4] *Cyprus Museum Catalogue*, No. 1086, and reff. *ad loc.* Brit. Mus. *Exc. in Cyprus*, fig. 156.

[5] The similarity between this Palestinian school and the Cappadocian, to which we shall have to recur, was first noted, I believe, by Conder, *Palestine Exploration Fund; Quarterly Statement*, 1900, p. 78. In *Excavations in Palestine*, pp. 94–95, Mr. Macalister replies by emphasizing the dissimilarity in detail between the single (then known) Cappadocian quadruped

B. *Mycenæan Accretions* :—

1. The only clear case of Mycenæan, or indeed of any Bronze Age Ægean loan, is the spiral diaper of Chantre, Pl. XI, 2. This spiral is of the simple tangential kind, traced with uncertain hand, and already in a fair way to lapse into a mere circle-and-tangent motive such as is so common in the art of the early Iron Age.[1] The nearest parallels are the infantile "pot-hook spirals" (*Hakenspiralen*) of Hissarlik II–V.[2] There seems to be another spiral motive in the broken corner of Chantre, Pl. XIV, 9.

2. The parti-shaded triangles on No. 24 are common in middle and later Mycenæan time, and in Cyprus last on into the Early Iron Age. This fragment is in a brick-red clay, different from that of the other sherds, and follows closely the outline of a common Cypriote type of oenochoe of the sixth century.

3. Characteristic of all fabrics which have undergone Mycenæan influence to any considerable degree is the use, collaterally, of single broad bands and systems of numerous very narrow bands; and this device comes out markedly on some of the wheel-made sherds from Marsovan, which may therefore be put back a good deal earlier than the more definitely Hellenizing plates and bowls from Boghaz-keui. The nearest parallel is in the bowls and plates of painted red-ware of the early part of the Early Iron Age in Cyprus. But the occurrence of the device of broad and narrow bands is not enough by itself to prove *direct* contact even with the latest stages of Mycenæan ceramic. It only proves contact with earlier (or at any rate more archaic) phases of sub-Mycenæan art than the majority of the points noted above under C.

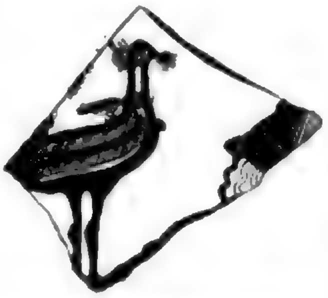

FIG. 9.—VASE-FRAGMENT FROM KARA-UYUK.

Handmade ; coarse clay, cream slip, black outline, red filling (shaded here).

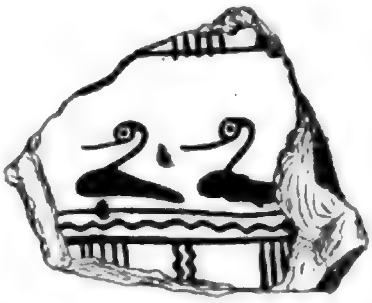

FIG. 10.—VASE-FRAGMENT FROM KARA-UYUK.

Handmade ; coarse clay, yellowish slip, slightly polished black paint, dull.

A. *Pre-Mycenæan Geometrical Residuum.*—Among the motives and devices which have no parallel from Mycenæan or sub-Mycenæan sources, the following are the most characteristic :—

(Chantre, Pl. XI, 1) and the numerous Palestinian examples (Bliss, *MMC.* fig. 188. *Exc. Pal.* Pl. 41), and between the geometrical idiosyncrasies of the two areas. But the similarity of the Cappadocian birds, which are now described for the first time, with the Palestinian ones (Bliss, *MMC.* Fig. 106 ; *Exc. Pal.* Pl. 41, 42, 44 : cf. the modelled bird, Pl. 47), would seem to have countervailing weight ; and it should be noted also that Mr. Macalister shows just the same tendency to underestimate the very copious Mycenæan loans in the repertoire of the "painted pre-Israelite" fabrics of Palestine.

[1] *E.g.* Hissarlik VII, *Schl. Samml.* 3625–8.

[2] *Schl. Samml.* 1739, 2360, 2406, 2469, 2470, 3502.

1. The use of banded ornament composed of alternate straight and wavy lines (Nos. 19, 24, Chantre, Pl. XII, 1). This is foreign to Ægean technique; but is well represented in Hissarlik V–VII[1]; and is characteristic of Mycenæan and late pre-Mycenæan Cyprus,[2] and of the Palestinian sites from the very beginning of the Mycenæan Age in that region.[3] In Egypt it occurs only in foreign imports of XVIIIth Dynasty date.[4] In Cappadocian sculpture it recurs at Yasili-kaya on the head-gear of the principal personage (Perrot-Chipiez, IV, Fig. 321).

2. The use of dotted lines, either between a system of straight bands, or fringing such a system, as in Chantre, Pl. XI, 4, 5; XII, 1; very rare in the Ægean; but common in the later Bronze Age incised techniques of Cyprus,[5] and occasionally transferred to the pre-Mycenæan painted style; common also at Hissarlik (II–V) in incised work, and here also transferred to one of the earliest of the very rare painted vases from that site.[6]

3. The use of dots to fill a space in a pattern, or to detach a pattern-motive from its background (Chantre, Pl. X, 3, 4, 5); closely akin to the last-named peculiarity, in its employment of dots instead of continuous strokes or lines; rare and late in Ægean ceramic[7]; common in the more developed stages of the incised style at Hissarlik (II–V); rare in Cyprus, but represented both in incised and in painted fabrics[8]; rare in the Palestinian painted fabric[9]; but highly characteristic of the peculiar Levantine "black punctured ware" of XII–XIIIth Dynasty date, which occurs in Egypt, Palestine and Cyprus, but has not yet been localized.[10]

4. The use of chevron ornaments composed of a large number of closely

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[1] *Schl. Samml.* 2243, 2300, 3196, 3341.

[2] *Cyprus Museum Catalogue*, Nos. 323, 328, 329, 344, 358, 368, etc.

[3] *Exc. Pal.* **36** (5); **37** (14, 21, 22, 34, 36, 37, 38); **38** (40–49); **41** (142); **43** (1, 2, 5.)

[4] Petrie, *Illahun*, Pl XXVI, 45 (the Maket tomb): *Kahun*, Pl. XXVIII, 20, cf. 8, 14.

[5] Very rare in the "red-ware" (Myres, *J.H.S.* xvii, 149), but characteristic of the later "black slip ware" which is contemporary with the first painted fabrics (*CMC.* p. 37, No. 118, 120 ff, 211).

[6] *E.g.*, *Schl. Samml.* 2297 (incised), 1739–40 (painted = *Ilios*, Fig. 264–5; *Troja Ilion*, Fig. 158).

[7] *E.g.*, a late Mycenæan *bügelkanne* from Lemnos, in the Smyrna Museum; occasionally in Ægean sub-Mycenæan; and frequent again in the "Phaleric" style of Attica. It is present also in painted ornament on the Karian "Idrias vase."

[8] *Cyprus Museum Catalogue*, Index, s.v., "Punctured ornament."

[9] *Exc. Pal.* Pl. **41** (152).

[10] On this "Black-Punctured Ware," see *CMC*, p. 38 (which gives the earlier literature); *J.H.S.* xvii, p. 149; and more recently H. R. Hall, *Oldest Civilization of Greece*, pp. 69–71. Note, however, that there is another unexplained fabric, with punctured ornament (often in outlined triangles) in pre-Dynastic Egypt; Petrie, *Naqada and Ballas*, Pl. XXX, 2–50; *CMC*, *l.c.* Mackenzie (*J.H.S.* xxiii, p. 163) seems to think that it may be Ægean, and akin to the neolithic ware of Knossos, which, in its more elaborate varieties, delights in punctured ornament. But there is in any case a great gap in time, and in form, between the neolithic ware of Knossos, and the mature "black-punctured ware" of the Levant; and it is only on the Syrian coast, so far as I know, that the characteristic forms of the black-punctured ware recur in the coarser domestic fabrics (at Lachish: specimens, unpublished, in the museum of the Palestine Exploration Fund, 38, Conduit Street, London, W.). The technique (*black* ware with *punctured* ornament) may, however, have been introduced from the Ægean, and translated into Syrian *forms*: compare the case of the red ware in Cyprus (p. 376).

packed lines as in Chantre, Pl. XII, 1, 2, 4, 5; unknown in the Ægean; characteristic of the incised red ware of Cyprus[1] and rare in the incised ornament of Hissarlik II–V[2]; but much less fully represented on the Cypriote painted ware; and absent from the painted ware of Palestine.[3] In the early white-on-red fabric of pre-Dynastic Egypt an analogous motive occurs regularly[4]; confirming the impression of early date which is conveyed by the Cypriote data.

5. The peculiar basal skeuomorph in Chantre, Pl. III, 9, is I think quite unknown in the Mycenæan Ægean[5]; but is almost universal on the painted cups of Cyprus[6] in company with the "wavy line motive" (A. 1 above). Its absence from the published examples of the Palestinian ware may be due to the circumstance that this series does not happen to include any bases of vessels at all.

6. Less important because more obvious, but copiously represented in all three groups is the band of close-ruled oblique lattice (No. 11), as distinguished from the sparse lattices (Nos. 7, 8, 16), which occur in almost all geometrical styles.

At this point it is perhaps worth while to note that among seven painted potsherds from Kouyounjik[7] which will be discussed more in detail below (p. 392) the dotted lines occur twice, and the dotted spaces and the close-ruled lattice band once each.

The Residual Cappadocian Style.—We have seen, from this analysis, that after making every allowance for contact with the Levant and the Greek world from Mycenæan times onward, there remains in the Cappadocian painted style an appreciable residuum which is not referable to an Ægean source; and the question obviously follows:—Is it native to Cappadocia; or if not, whence is it derived; and in any case, is it related, or not, to other non-Ægean paint-traditions in and round the Mediterranean basin?

To present the evidence fully and fairly, it is necessary first to note that at two (if not three) other points, round the margin of the Ægean world, just the same problem recurs. (1) In the Levant, in Cyprus and on the Syrian coast Ægean colonists found geometrical painted styles in vogue already on their arrival, more elaborate than could be explained by any contact with Egypt, which until the

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[1] *Schl. Samml.*, 2342, 2350, 2407, 2441, 2458; but seldom with more than three lines in series, whereas Cappadocia and Cyprus use larger groups freely.

[2] *Cypr. Mus. Cat.*, 76 ff 85, 111, 200, 204, 211, 215; *KBH*, Pl. XXXV, 3; XXXVI, 4*b*: CLXXIII, 20 k.

[3] *Exc. Pal.*, p. 95.

[4] Petrie, *Naqada and Ballas*, Pl. XXIX.

[5] Not only so, but on a Cypriote-looking vase from the Hagios Onuphrios deposit (Evans, *Cretan Pictographs*, Appendix, Fig. 106*b*), a quite different pattern occurs in its place. The large majority of Ægean vases, even of the earliest periods, have distinct standing-surfaces, if not regular bases or base-rings, and consequently basal decoration has not often the chance of occurring at all.

[6] *K.B.H.*, Pl. CXIX, 5, b, clxxii, 15, h.

[7] Perrot-Chipiez, *Histoire de l'Art dans l'Antiquité*, ii, Figs. 372–9.

XVIIIth dynasty hardly uses paint in its ceramic art at all, and quite free from indications of Ægean origin or influence.[1]

(2) In Thessaly, on the very margin of the home area of Ægean culture, a geometrical painted style occurs on neolithic sites, with a rich and mature repertoire of quite un-Ægean complexion. The only sign, in fact, even of contamination by Ægean tradition is the occasional intrusion of rude misshapen spirals into an otherwise rectilinear design.[2]

(3) In the west, also, in chalcolithic Sicily, the Mycenæan colonization found the elaborate geometrical painted style of Castelluccio[3] already decadent, if not practically extinct, before the advance of a sort of red-ware bucchero, which remains the predominant native fabric of Sicily throughout the Mycenæan Age.[4] In a previous essay[5] I have attempted to connect the painted Sicilian style with the similar painted and hand-made styles which survive still in Kabylia, in the Aures, and as we now know, also in Tunis[6]; and northwards, also, an analogous tradition seems to underlie the peculiar native painted styles of Apulia in early Hellenic times.[7] Here then, along the Italo-Tunisian landbridge westward, in Thessaly immediately northward, and eastward between Cappadocia and the borders of Egypt, the Ægean world appears to be fringed with a series of foci of painted geometrical ceramic.

It would be easy to accept the tempting hypothesis that each of these foci represents an attempt on the part of barbarous neighbours to adopt, at a pre-Mycenæan phase, an Ægean invention of painting; and the vistas of time which are opened out, as the Knossian palace unfolds its story, make this explanation far more possible now than it would have been five years ago. But there are two considerations, of which this suggestion hardly takes account. The first is that, in each case, the geometrical styles present certain broad similarities of convention, and also certain peculiarities of handling, which are common to two or more of these geometrical schools, but are not recognizable in any stage of Ægean painted ceramic.

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[1] *Exc. Pal.*, Pl. 36 (upper half). Mr. Welch (*Q.S.*, 1900, p. 342, = *B.S.A.*, vi, p. 117 ff) was inclined to distinguish between (α) an imported style with a "dull white wash" on which "designs are drawn in dull black, and a dull cherry red is used for subsidiary purposes," and (β) a "much coarser make, with white or reddish-white wash, and very carelessly drawn designs in light reds and browns": the latter presumably unsuccessful attempts to copy the black and the red of (α). But he regarded his "imported" class as of Cypro-Phœnician origin; and Mr. Macalister, using a larger series, and finding many intermediates, objects with reason (*Exc. Pal.*, p. 90) to over-rigid bisection of the fabric. His own conclusion, however, that *all* the varieties are of native Palestinian origin, may need revision after more thorough investigation of the clays; and Mr. Welch is wholly justified—if I understand his expressions aright—in emphasizing the existence of a very distinct non-Palestinian influence, which at the same time is equally non-Mycenæan.

[2] The Thessalian material is not yet published, but a summary of the first season's work was published by Mr. R. C. Bosanquet in *Man*, 1902, 76; and by the courtesy of the discoverers, MM. Stais and Tsountas, type-series of the pottery are to be seen in the FitzWilliam Museum at Cambridge, and in the Ashmolean at Oxford. A bare mention of its existence will be found in *J.A.I.* xxxii, 255, *n.* A quite different explanation of the Thessalian finds, as proto-Mycenæan, has been suggested by Prof. Ridgeway, *Class. Rev.*, xvi, 80; cf. p. 93; but awaits confirmation by some evidence.

[3] Orsi, *Bullettino di Paletnologia Italiana*, xix, Pl. V, VI, VII.

[4] Orsi, *B.P.It.*, xv, Pl. VII; xvii, Pl. V, VI, XI; *Monumenti Antichi*, ii, Pl. 1, 2.

[5] *J.A.I.*, xxxii, 250 ff.

[6] Myres, *Man*, 1903, 47. Subsequent evidence, collected in 1903 by the Hon. John Abercromby, F.S.A., is deposited in the Pitt-Rivers Museum, but is still unpublished.

[7] Patroni, *Monumenti Antichi*, vi, p. 350 f.

The second is that in each case the introduction of painted ornament is accompanied by the introduction of the practice—not universal, but common and characteristic—of applying a dense white chalky slip, of a different texture and composition, to the natural surface of the vessel, before putting on the painted ornament. The Cappadocian custom is sufficiently illustrated already; in the Levant, two distinct fabrics are known, "the white slip ware" of the *Cyprus Museum Catalogue*, and the white-faced ware of the Palestinian lowland, as described by Mr. Welch. In Thessaly, a white-slip is almost universal, and often very dense: it is only in the later stages of the fabric, apparently, that it gives place to a surface of buff or brick-red. In the west the case is not quite so clear, for at Castelluccio, in modern Tunis (Khoumiria), and in the Aures, the black paint is laid directly on a burnished red-ware; but at Villafrati near Palermo a dense chalky slip occurs on painted terra-cotta figurines, and also on some of the pottery[1]; in Apulia a white or very pale cream or greenish slip is usual, especially in the earliest phases; and in the Kabyle fabric a chalky white ground is regularly prepared, for the painted ornament, with a special kind of clay.[2] Needless to say, no such special preparation of the surface is usual at any stage of Ægean ceramic: the regular practice in Mycenæan times is to paint upon a surface which is indistinguishable in composition and tint from the cross fracture of the clay. Where a coloured slip occurs at all, as in the Attic and some other local fabrics, to disguise an unsuitable clay, the potter's object was clearly to produce, not a *white* ground, but an imitation of the cream-tinted clay of the standard Mycenæan fabric; and the *black* surface of the earlier "Minoan" styles, though apparently an exception, can hardly be reckoned so in reality, being produced, not by a clay-slip, but by a dense black vitreous glaze, and originating, apparently, in an area which, as we have already seen (p. 373), had a distinct inclination to black-ware technique, in the period immediately preceding the discovery of painting.

Whether these similarities of style and technique among the non-Ægean painted fabrics are accidental coincidences, or symptoms of some original connection, the evidence at present available hardly permits us to inquire. All that is attempted at the moment is to establish a probability that in its origin the Cappadocian style is independent of Ægean tradition; and we have already seen how slight is the influence which Ægean ceramic exercised upon it, until the point at which the Mycenæan colonies in Cyprus and on the Syrian coast parted company for a while with their shattered motherland, in the chaos of the Early Iron Age.

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[1] Palermo Museum (unpublished).

[2] Randall MacIver and Wilkin, *Libyan Notes*, 1890.

A Syro-Cappadocian Province of Ceramic Art.

That this Early Iron Age connection between Cappadocia and the Levant stands on the lines of a much more ancient connection will, I think, be clear from what follows. The argument is threefold:—(*a*), from the decorative repertoire; (*b*), from a characteristic pigment: (*c*), from a characteristic treatment of pot-surface: and the conclusion is the establishment of an early and persistent Syro-Cappadocian province of ceramic art, with Cyprus as a trans-marine outlier, and a receptacle of obsolescent phases.

(*a*) *The Decorative Repertoire.*—The correspondences already noted between the "pre-Mycenæan residuum" in the Cappadocian repertoire, and the pre-Mycenæan repertoires of Cyprus and the Palestinian sites, will have made it clear already that these three areas are to be included at all events so far as their ceramic is concerned in a single pre-Mycenæan culture-province; and that, when the frequent analogies with Hissarlik II–V are taken into account, the limits of this Syro-Cappadocian culture-province approximately coincide with those of the non-Egyptian red-ware province, as defined already in the earlier part of this paper: the principal difference being that the Ægean area of the red-ware province —which we have seen to have been at no time very closely annexed to it, and attached to it rather by the land-route and a Hellespontine link, than by the sea-route and a Cypriote intermediary—has already broken loose and diverged on a career of its own, in such a fashion, and presumably at such a date, that no clear link can be found between the earliest Ægean painted wares and the paint-tradition even of Cyprus, the member of the Syro-Cappadocian province which lay far most nearly in a position to effect such contact. In other words, the art of painting pottery, if introduced at all into the Ægean (and not rather invented independently in Crete or the Cyclades), was introduced otherwise than from Cyprus, and developed, from the first, on wholly different lines from those which prevailed there.

(*b*) *The Red pigment.*—Conspicuous among the peculiarities of the Cappadocian pot-style is its lavish use of red paint, alongside of the black, and in a category of almost equal importance with it.[1] Note, particularly, how the broad red areas, whether the body of a bird (Fig. 9, p. 385), or a triangle or lozenge, or a chequer, or a mere zone, are edged or escorted with narrow black margins, a trick of hand and eye which has obvious uses, and recurs with remarkable persistence. The converse, black edged with red, never, I think, occurs at all; the red is always (at bottom) the *secondary* or *supplementary* colour;[2] and it is only in certain phases of the

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[1] Chantre, Pl. III, 1, 4 faded), 6, 7 (all from *Boghaz-keui*); X, 4, 5, XI, 1, 3 (faded), XII, 1, 2, 3, XIII, 1 (faded), XIV, 4 (all from *Kara-uyuk*); compare Nos. 4, 5, 6, 9, 11, 12, 13, 16, 20, 21, and the dots on No. 8.

[2] Conversely, in Egypt, which we shall see (p. 394) to be a derivative area, this *foreign* colour scheme is misunderstood and reversed, so that we *now* have *black* edged with *red*. Petrie, *Kahun*, Pl. XXI, 65, 50 (Gurob).

Cappadocian school that it comes so near to equivalence with the black, as it does (for example) in Chantre, Pl. XI, 1. To connect this phenomenon with what follows under our third heading (*c*) below, it should be noted, to begin with, that the successful use of a half-tone pigment alongside of the black postulates an intention, and the skill, to make the ground tint approximate to dead white; for on a cream or buff ground, this red paint will lose its value, and on an orange or brick-red ground it will assuredly jar,[1] especially in the plum-coloured or "purple" varieties, which observation shows to have been peculiarly esteemed in Mediterranean lands. The question of the red-paint is therefore intimately connected with that of the dead-white ground, and of the chalky non-ferruginous earths which alone can be trusted to secure it.[2]

Now the red pigment, and its sequel, the trichrome technique of black-red-and-white, have a very definite range in the Mediterranean world, and may help us somewhat to determine the history and relationships of the Cappadocian painted style.

At Hissarlik, curiously enough, the very few attempts at painted decoration which appear, before the date of the intrusion of full-blown Mycenaean fabrics, are all experiments in a red pigment on the natural ground of the clay. The earliest apparently is the rude pyxis-and-cover, *Schl. Samml,* No. 1739–40, already quoted for its dotted interlinear ornament, and for its pot-hook spirals. In this case Dr. Schmidt notes that the red pigment is, apparently, merely the ordinary slip (*Ueberzug*) of the red-ware, applied with a brush instead of with a bucket or a mop. But it is not long before an "intense dark-red" pigment (*intensiv dunkel-roth*) appears, as on Nos. 1902ff. and 1906: and then follow more examples of a *polishable* paint, presumably still closely akin to the old red slip, as in Nos. 3554, 3560, etc., sometimes, however, left unpolished, as in Nos. 3555, 3556. Finally on a vase (No. 3502) of Mycenæan form, and consequently of advanced date (Hissarlik VI, or the top of V), there is mention of a regular "lustreless purple paint" (*violett-brauner matter Farbe*), which would bear comparison with the coarser "purple" pigment of Hellenic orientalizing vases; and which is, moreover, far from normal in the culture-cycle to which this vase would be referred on the unqualified evidence of its form.

For in the Mycenæan world there is no true trichrome ceramic.[3] Occasionally, in isolated vases from the shaft graves of Mycenæ, and from other sites, a rare red pigment appears as an accessory, and when it appears, is used in an exactly similar fashion, to enhance the central or emphatic points in an otherwise black-painted design. Only on the Mycenæan fringe, in Cyprus, and in the latter part of the Mycenæan occupation of that island, does the red rise to anything like the importance which it has on the Palestinian coast throughout.

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[1] This disagreeable effect is well seen on the later trichrome red-wares from Boghaz-keui (p. 380 above) and Mytilene (fragments in Brit. Mus., p. 12 *n*), and on the Attic and Corinthian black-figured fabrics with white and purple accessories.

[2] For the technique of a white-faced fabric, and the emergence of a trichrome decoration with closely similar handling of the black and the red, under circumstances which preclude imitation, compare the hand-made pottery of the Zuñis and Hopis of North America.

[3] The publication of the British School's *Excavations at Phylakopi in Melos*, since the above statement was in type, makes it necessary to qualify it. Melos, in fact, *had* a fine school of trichrome in pre-Mycenæan (= Minoan) times. But note :—

(1) That this is a local school, confined to Melos.

(2) That, with the exception of the rare stray vases noted in the text, Ægean ceramic repudiated the Melian innovation.

Here, in the first place, it is persistent throughout the period of Mycenæan influence. It does not survive it, as we shall see that it does in Cyprus; for painted ornament, except of the most careless and debased description, disappears in the "Jewish" period altogether.[1] But, whereas in Cyprus the trichrome comes in later, in the Mycenæan period, in Palestine it antecedes it, appearing, even in the lowest strata, in a well-defined, and purely geometrical style of ornament,[2] the motives of which are closely allied to those of the painted ware of pre-Mycenæan Cyprus, and to the *residuum* which we have already isolated in the Cappadocian repertoire.

Looking further east again, we have the small series of fragments, already mentioned, from Kouyounjik.[3] They are of Sargonid date; they repeat very closely the typical repertoire of Cappadocia; and in more than one instance they show the red pigment supervening in characteristic fashion upon the black. So much closer is their similarity with the Cappadocian group, and particularly with matured phases of it, than with anything from Palestine hitherto, that they must certainly be regarded as representing some of the first imports from the west along the great road which the Sargonid conquests had recently thrown open as far as the Taurus and beyond. Palestinian analogies, it should be noted, in passing, are further ruled out of court conclusively by the circumstance, already noted, that the extension of Israelite hegemony over the Philistine lowland had made a full

(3) That the discovery of this Melian focus explains, and discounts, the abnormal vases with red details, above mentioned.

(4) That the Melian school is probably of independent and spontaneous origin. For (*a*) Melos has copious ruddle pigment of its own; (*b*) the red paint is used *alone* (as at Hissarlik) as well as in combination with the black; (*c*) the black seems to begin, in some fabrics (the bowls with painted rim), as an accessory to the red, and to fill whitened panels in a *red-ware*.

(5) The native Melian clays (at Phylakopi at all events) are so highly ferruginous that it was difficult to get black or red to give its full effect on their surface, and consequently along with the opportunity for trichrome, which was afforded by the presence of ruddle, came the compulsion to devise a white slip for the painted surface, which happened forthwith, and remains characteristic of "Melian" ceramic down into Hellenic; times a striking confirmation of the suggestion as to the genesis of the white-slip fabrics which is suggested above (p. 391).

The whole Melian episode in fact is a small scale replica of the Cappadocian ceramic, with the sole difference that while Melos lay within the Ægean, and succumbed early to Mycenæan technique, Cappadocia lay remote from it, and survived with its ceramic style mainly independent.

[1] *Exc. Pal.*, Pl. 49–55.

[2] *Exc. Pal.*, Pl. 36.

[3] P. 379 above. Perrot-Chipiez, *Hist. de l'Art*, ii, Fig. 372–9 (= Pl. XLII herewith).

end of painted and zoomorphic technique in that region, some centuries before its conquest by Sargon and his successors.

The Cappadocian Focus.—This distribution of the occurrences of red pigment is instructive. A mode of decoration, which only affects the Mycenæan ceramic[1] after Mycenæan communications are already established with Cyprus, but which is not native to Cyprus itself[2], while in Egypt it only occurs as an intrusion, must belong to the mainland of Asia either north or east of that island. Next, as between Asia Minor and Palestine, a style which only appears in Assyria after the Sargonid raids beyond Taurus, and centuries after its disappearance from Palestine, was clearly more deeply rooted in Asia Minor than on the Syrian coast. And that it was of pre-Mycenæan antiquity in Asia Minor is suggested already by the evidence from Hissarlik. Further evidence of an Anatolian origin is supplied by the circumstance that it is just during the period of the elaborate trichrome style in Cyprus,[3] from the end of the Mycenæan to the beginning of the Hellenic period, that Cyprus is most copiously indebted to Anatolia for a new series of conical, pyramidal

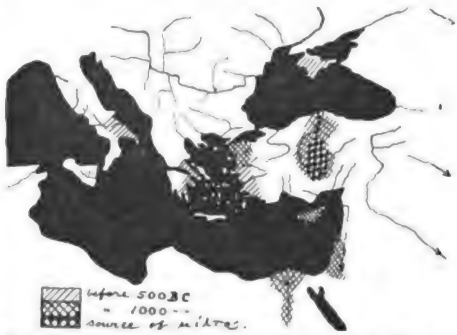

FIG. 11.—DISTRIBUTION OF THE RED PIGMENT (μίλτος), 1500–500 B.C.

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[1] With the Melian exception already accounted for on p. 391 *n* [3].

[2] There is one very rare Cypriote fabric (I only know five examples: Cyprus Museum, British Museum, Constantinople, and a surface-fragment from Kalopsida) which has buff (apparently Cypriote) clay, black paint-like slip, and *red* painted imitations of the incised white-filled lines of the Cypriote red ware. It seems to belong to the period of the other "black-slip" wares, of the middle period of the Cypriote Bronze Age; immediately before the Mycenæan colonization. Cf. *CMC.*, p. 39, and Nos. 401–2; Brit. Mus. Vase-Room A 134.

These black-slip wares *may* betray remote Minoan influence (cf. the Minoan surface-fragment from Curium in the British Museum *CMC.*, p. 39 *n*); but I think that more probably they represent a reverse contamination from the margin of the black-ware using area of Anatolia (Adalia: Bulghar Ma'aden: v. above p. 372); and in this case the occurrence of red paint also is significant. The use of a *red* filling for incised ornament on black ware is known from Crete, Austria and North Italy; but is always very rare; and probably also usually a spontaneous variant of the *white* filling. Note also that the Palestine Exploration Fund's Museum has one example of a *modern* fabric from South Palestine with dense lustrous black-slip and painted ornament in a lustrous red (like sealing wax); but I have not been able to get information as to its exact distribution; and mention it only in order to call attention once more to the unworked field which is offered by the modern (rapidly evanescent) pot-fabrics of Mediterranean lands: compare my note on the Tripolitan fabrics in *Man*, 1901, 83.

[3] The discussion of the relations between Cyprus and *Egypt*, in this regard, in *CMC.*, p. 17, were in type, though not published, before the appearance of Chantre's work in Cappadocia; and consequently do not contemplate an Anatolian focus.

and hemispherical seal-stones, which begin at the close of the Mycenæan, and persist until the irruption of fresh Egyptian scarab-types in the seventh century.

Meanwhile, even the early apparition of red paint and trichrome ornament in the Palestinian area falls now into its proper place, in confirmation of our hypothesis of an Anatolian origin. For here an explicit trichrome geometrical style emerges, full-blown, in an area which had no previous painted style at all, and which relapsed into monochrome as soon as the Mycenæan stimulus was withdrawn. The trichrome then is probably not native to Syria. It is equally not native to Egypt, for it does not appear there till after it has become naturalized in Syria (roughly, under Amenhotep III.); so it cannot have come in from this side. Further, it had not been in Syria long, when the Mycenæan colonization began; for there is little variation in the style of the pre-Mycenæan trichrome, and no great depth of deposit through which it occurs. Now under these circumstances it can hardly be a coincidence that it is precisely in the centuries immediately preceding the Mycenæan colonization that Syria and Palestine lay under the domination of peoples whose centre of dispersal seems to lie in the Anatolian side of Taurus; and probably we may take the Palestinian trichrome as a by-product of this intrusion.

Turning finally to the later history of Cappadocia, and to its relations with the Hellenic world, it will now be no surprise to find that the introduction of purple-red paint and trichrome ornamentation into the early Hellenic pot-fabrics of Ionia (Thymbra, Samos, Miletos) and, eventually, of Hellas proper (Eretria, Corinth, Melos), coincides approximately with the traditional dates for the Milesian exploitation of the Pontus, and of the Pontic access to the Plateau. Nor is it any longer remarkable, either that one of the staple exports of Cappadocia in Hellenic times should have been the "red-earth," *μίλτος*, of which, in its finer qualities, it had a practical monopoly; or that the *μίλτος* itself should have passed for long under the trade-name of "earth of Sinope."[1]

(*c*) *The White-Ground Fabric.*—The only other peculiarity of the Cappadocian pot-fabric which needs explanation is its fondness for a chalky white or cream-coloured slip; and there is, fortunately, another mineral product of Cappadocia which may very probably be regarded as providing a clue. This is the *meerschaum* which occurs widely and abundantly on the plateau, and is largely worked now in the neighbourhood of Kaisarieh and elsewhere.[2] The evidence as to the use of this or similar minerals for pot-slip and pigment, is as follows:—

(1) On the Cappadocian sherds it is common, though not universal, and varies according to the purity of the material, from white to cream, buff, or pink.

(2) In the Mycenæan world, no such thick, chalky slip occurs at all. The majority of the fabrics use a slip of the same composition as the clay; and those,

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[1] Strabo, 540: cf. Ramsay, *Historical Geography of Asia Minor*, pp. 26, 28.

[2] The similarity between meerschaum and the chalky slip of the potsherds from Kara-uyuk was pointed out to me first by Mr. Crowfoot in a note which accompanied the potsherds.

which attempt to disguise the quality of the clay, aim at imitating the cream-coloured argillaceous surface of the more typical and successful varieties.

(3) The Minoan styles in Crete, with their dark-ground technique, have an obvious use for white *paint*, and employ a dense, chalky pigment as the basis of what eventually developes into an elaborate polychrome style, the acme of which coincides approximately, in time, with the eleventh dynasty of Egypt. But from this point onwards, its history is that of a decline before the advancing technique of the "Mycæneau" style, which is of Cycladic origin apparently,[1] and is characterized, as to surface, by a self-coloured ideal, and as to paint, by a black ferruginous umber with strong tendency to vitreous flux in the furnace—the *Firniss-malerei* of Furtwängler's "Third Style." Consequently, though the decadence of the "Minoan" technique was of long duration, its supersession was practically complete by the time of the eighteenth dynasty; and white paint only lasts on into "Mycenæan" art as a rare and belated provincialism.

(4) In Mycenæan Cyprus, however, there is a distinct tendency towards a more copious use of a dead white chalky pigment, to accentuate details in the black-glaze designs. And at Enkomi, at all events, contamination is clear between the later Mycenæan work and a white-painted black ware of Levantine origin which will come into view in the following paragraph.[2] After the close of the Mycenæan period this white paint becomes rarer, but it never disappears altogether, and it shows a distinct recrudescence in the native work of the sixth and fifth centuries, associated once more with a group of experiments in white-slip, which ought some day to be worked out in detail.[3]

(5) On the Syrian coast, meanwhile, there is a good deal of white incidentally introduced into the Mycenæanizing ceramic already mentioned. There is also—to be located eventually—somewhere in this corner of the Levant, a very remarkable fabric which is characterised by a peculiarly hard, thick, white,

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[1] Dr. Mackenzie, however, seems to maintain a Cretan origin for the black-on-buff styles also; or at least that the independence of the Cretan and the Cycladic schools has been exaggerated. *J.H.S.*, xxiii, p. 156–70.

[2] *Brit. Mus. Exc. in Cyprus*, Fig. 66^{1180} (Mycenæan form, Levantine technique): Fig. 63^{1022-3}; 64^{1003}, ^{1007}, ^{1025}: 71^{927}, etc., Mycenæan forms: (white details on black paint).

[3] For brevity, I have noted *concurrently*, in each area, both (*a*) the white-faced fabrics, and (*b*) the employment of a white pigment. The two phenomena do not of course stand in any necessary connection with one another; but as in the case of the *red* slip and red paint at Hissarlik (v. above, p. 391) the use of either is so likely, *ceteris paribus*, to lead to the other, that there is an obvious advantage in recording the occurrences of both in one and the same survey. For if, as in Minoan Crete, white *paint*, though known and valued, did not lead to a white-faced fabric, the probability is that, in some fashion, which we are hardly likely to be able to formulate as yet, South Ægean æsthetic repudiated white-faced ceramic. Conversely if, as in Cappadocia, a white-faced style failed to lead to the use of white pigment even as an accessory—at all events till the old *régime* was breaking up, as in the Hellenizing wheel-made fabric of Boghaz-keui—the presumption is that any dark-ground ceramic, on which alone white paint could be employed effectually—*i.e.*, any ceramic *except* the white-faced—was repudiated æsthetically in Cappadocia. The white printed blackware vase from Emed has, I think, been satisfactorily discounted already as a Cypriotizing experiment (p. 373).

chalky slip, of which account must be taken in any attempt to elucidate the white-slip tradition. This fabric is best illustrated in those hemispherical bowls which Professor Flinders Petrie formerly described at Tell-el-Hesy as "Phœnician[1]:" but it has a large and characteristic repertoire of other forms also. All these forms, however, bear, in form and ornament, the same clear traces as the hemispherical bowls themselves, of derivation from archetypes of sewn leather, stiffened by ribs and handles of pliant wood.[2] The fabric ranges in space from Cyprus, where it is most abundant hitherto—though not apparently ever native there—eastwards over the Palestinian coast (Tell-el-Hesy), southwards to Egypt, and westwards as far as Thera, Melos, Athens, and Hissarlik VI. On the Palestinian coast actual examples are rare. But it is here alone, as yet, that anything in the common pottery recalls analogous forms, or suggests a local origin for the masterpieces.[3] In date its limits are clearer; it begins and ends under the eighteenth dynasty in Egypt; in Cyprus it seems to begin at about the same time as the Mycenaean imports, and ends before the coming of iron; and the Ægean instances agree on the whole with these limits, though the Theræan example, associated with Cycladic equivalents of "middle Minoan," may be somewhat earlier.[4]

Here again, as in the case of the red pigment, the date of the apparition of this fabric coincides approximately with that of the Syro-Cappadocian intrusion; and it is possible that here too the occurrence of a white-slip fabric may be a symptom of the latter process. Only excavations on a North Syrian or a Cilician site can settle the question.[5]

It is worth while, however, to follow downwards, as in the case of the red pigment, the fortunes of the white-slip fabric and of white pot-pigment in the direction of Hellenic times. The white pot-pigment makes its appearance in close association with the red pigments in the early Ionian schools and their counterparts in Hellas, and follows much the same course. Its history is complicated however by the survival, in Argolis (Heraion) and possibly also elsewhere, of the provincial-Mycenaean tradition, of an accessory use of white, and the two traditions probably coalesce; though in the case of the Argive white-work, long dearth of a true white pigment had apparently led to the substitution of a cream-coloured local clay, which contrasts markedly with the dead white of the "orientalizing" fabrics.

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[1] Petrie, *Tell-el-Hesy*, p. 45–6.

[2] This was pointed out at once by Petrie, *l.c.*, p. 45.

[3] The Levantine "Black Punctured Ware," already mentioned (p. 386 *n* [10]), the place of manufacture of which is uncertain, exhibits also a rare variety which is wholly encased in a similar dense white slip. Petrie, *Illahun*, Pl. I, 21.

[4] It is associated also, curiously enough, with one of the very few Cycladic examples of a dark-faced fabric with ornamentation in white, the well-known lily vase (Perrot-Chipiez, *Hist. de l'Art*, vi, Pl. I). This vase however, itself bears every mark of affiliation to the true dark-faced style of "Minoan Crete.

[5] I have failed, hitherto, to find any detailed account of the ceramic of Sinjirli.

But it is not merely white pigment which revives when the Pontic ports were opened. From Phanagoria to Naukratis, along the track of Milesian enterprise, there springs up a whole cycle of well-marked pot-fabrics with the common characteristic that the ground-colour of the clay is ignored, and its surface is disguised and prepared for the painter by a thick, dense, chalky-white slip, of the same peculiar texture as the much earlier white-slip-ware of the Mycenæan Levant, and as the finest of the Cappadocian fragments. Here again, in all probability, we may attribute the Milesian predilection for a dead-white ground to the manifold community of interest between Miletus and the Anatolian Highland. It is not merely that the raw material, the *meerschaum*, came down along with the "Sinopic earth," from Cappadocian sources,[1] and from an area where we may now fairly assume it to have been long in use for ceramic purposes. The characteristic motives of the Milesian decorative repertoire were themselves of Anatolian, and presumably in part, of Cappadocian origin,[2] and the association of these, in their textile archetypes, with a dead-white ground of *bleached wool*, provided also both an industrial and a commercial link. For the same "fullers' earth," which scoured and whitened the wool, was—and is—quarried from Cappadocian sources in close association with the meerschaum, with which (as in modern Algeria) it was probably often interchanged. Like the meerschaum also, the fullers' earth was apparently a regular object of export from Cappadocia to the Hellenic wool-staples, of which it is well established that Miletus, once more, was among the chief.

The scanty data, and vague general outlines which precede, are all, I believe, which can be made out with any probability, at present, concerning the ceramic history of Asia Minor, down to the period when even its central plateau began, as we see at Boghaz-keui, to feel the touch of its Hellenic fringe. With only two stratified sites excavated as yet, and only one series of tombs at all carefully explored, it may well be felt that even this vague sketch is in parts imperfectly substantiated, or perhaps that it is wholly premature. But it is partly a test of a method; and to postpone the formulation of the results which that method seems capable of yielding, until at an indefinitely distant date scientific excavation gives us materials enough to construct a full sequence-series, would seem to argue undue distrust of facilities which lie to hand. Whether the method of typological analysis is untrustworthy in such a case or not, the opportunity which renders it superfluous alone can show. The only way, therefore, to give this method a fair trial has seemed to be to jettison precaution, and formulate its conclusions before the Gordian knot can be cut by the more fortunate explorer. If these results are then confirmed, it is a gain to have emitted them beforehand; if not, there is, meanwhile, at least the hope that it may be these guesses which have provoked disproof.

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[1] Strabo, 540 (following the passage about the red "Sinopic earth" already quoted, p. 394 above), "There is also a place (in Cappadocia) which produces a white stone, like ivory for colour, in pieces like whetstones but not large ones"—he is describing, no doubt, the raw material in its export state—"of which they used to make the handles for knives." He then goes on to mention a mineral (probably mica) which was translucent enough for use in windows, and occurred in large enough masses to be worth exporting.

[2] This results, conclusively, as Dr. Boehlau has shown, from a comparison of the *Füllen-ornamente* of the "animal-frieze" vases, and "Rhodian plates" from Kamiros (which are shown to be Milesian by their correspondence with the local fabrics of the Milesian centres at Phanagoria and Naukratis) with the representations of richly-ornamented draperies on Hellenic vases. The comparison is strengthened further by the collation of (*a*) the ornamental draperies shown on "Hittite" monuments from the Syro-Cappadocian area (*e.g.*, Ibriz, Perrot-Chipiez, *Hist. de l'Art*, iv, Fig. 354); (*b*) the *fresh* motives which enter Assyrian representations of textiles in Sargonid times; (*c*) the survivals of ancient Anatolian *Füllen-ornamente* in certain fabrics of recent Anatolian carpets. Compare also Mr. Crowfoot's note on one of his fragments from *Derekeui Kale* near *Giaour Kalesi*. *J.H.S.* xix, p. 39:—"At first I thought it might belong to a late Mycenæan fabric, but Mr. Cecil Smith has convinced me that it is Naukratite."

It is curious, meanwhile, that in his summary of the geography of Asia Minor in Herodotus v, 49, Aristagoras of Miletus makes no mention of sheep-farming in Cappadocia; though he describes both (*a*) Phrygians and (*b*) Armenians as "the greatest sheep-masters within our knowledge" ((*a*) πολυπροβατώτατοι τῶν ἡμεῖς ἴδμεν . . . (*b*) καὶ οὗτοι πολυπροβατώτατοι). The defect, however, is made good, to some extent, by the rock sculpture of Ibriz, and by the other evidence quoted above.

Description of Plates.

Plate XXXIX.

1, 2. Human figure from Keuhne Hammam; preserved from the groin upwards (2·5 cm. high): the left arm, and the right as far as the elbow are missing, and the head is detached. The width and distortion of the groin show that the figure was equestrian. The trunk is a flattened cylinder of rather coarse clay, grey before firing, turning yellow in the fire; with numerous small bits of mica, and a fine self-coloured slip, which takes a good polish, but is much destroyed.

The arms were added in separate pieces, loosely plastered on to the trunk. The head, nearly globular, has large ears, prominent eyes, beneath arched eyebrows which pass directly over into a prominent straight-edged nose. The mouth is indicated slightly, but the chin is damaged. On the head is a sort of Phrygian cap, laterally compressed with high fore and aft ridge from the brow to the nape of the neck.

On the slip, simple geometrical ornaments are painted in black: and there are traces of black on the eyes, and round the rim of the cap. At the base, behind, there is a broad triangular patch of purple red (perhaps indicating the saddle): and there are traces of a similar patch in front, and of other red paint on the breast. The polish was put upon the slip after the painting was finished (p. 378).

3, 4. Part of the rim of a large bowl from Kara-uyuk; clay coarse, of a pink tint, with light-coloured grains; slip thick, chalky, and lustreless; faint brown paint, much absorbed by the slip. On the rim reclines a ruminant animal (cow or goat) modelled in relief: the head is missing. The style is vigorous, and reminiscent of early Hellenic work; but the execution is rough. The extreme length of this fragment, measured along the rim, is 11 cm. (pp. 378, 380). Note that on p. 380 and on the title to this plate, this fragment is wrongly described as coming from Bolus.

Plate XL.—Cappadocian Painted Fabrics.

1. Zille.
2. Bolus.
3. ,,
4. ,,
5. ,,
6. ,,
7. Zille.
8. Bolus.
9. Crowfoot, *J.H.S.*, xix, p. 39 ("fragment δ").
10. Karayakub.
11. Bolus.
12. ,,
13. ,,
14. Bolus.
15. ,,
16. Karayakub.
17. Bolus.
18. Marsovan.
19. Kuruk-kale (Eccobriga), *J.H.S.*, xix, p. 39, Fig. 3.
20. Bolus.
21. ,,
22. Giaour kalesi, *J.H.S.*, xix, p. 39 (not figured there).
23. Bolus.
24. ,,

Plate XLI.—Palestinian Painted Fabrics (for comparison).

[Reproduced through the courtesy of the Palestine Exploration Fund.]

25. "Mound of Many Cities," Pl. 5, Fig. 190.
26. ,, ,, ,, ,, ,, 192.
27. "Excavations in Palestine," Pl. 36, Fig. 5 (lowest stratum: red and black on buff).
28. ,, ,, ,, 37, ,, 36.
29. ,, ,, ,, ,, ,, 34.
30. "Mound of Many Cities," Pl. 5, Fig. 189.
31. ,, ,, ,, p. 63, Fig. 109.

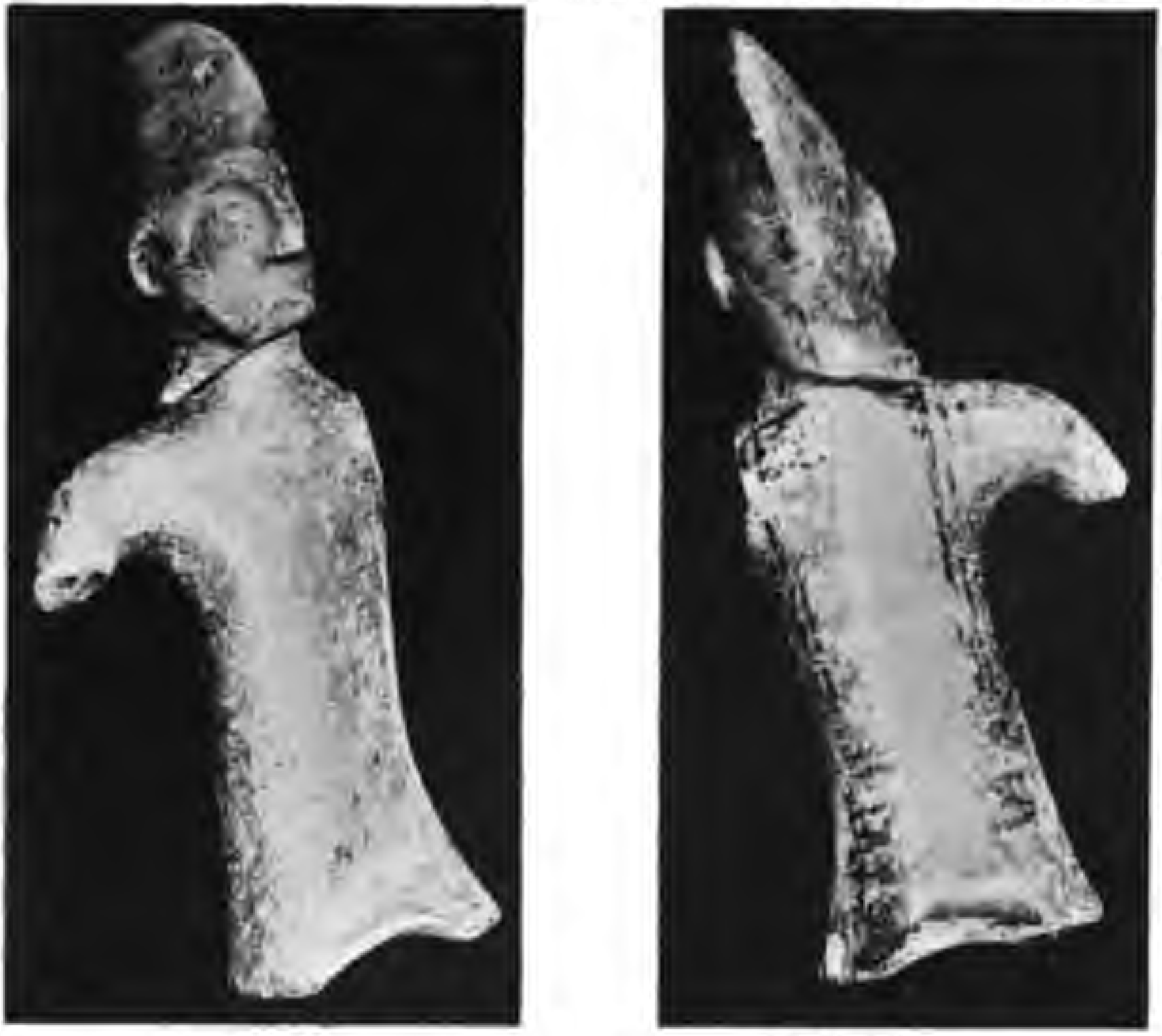
32. "Mound of Many Cities," p. 63, Fig. 108.
33. ,, ,, ,, Pl. 5, Fig. 193.
34. ,, ,, ,, p. 63, Fig. 107.
35. "Excavations in Palestine," Pl. 37, Fig. 14.
36. ,, ,, ,, 36, ,, 9 (lowest stratum).
37. ,, ,, ,, ,, ,, 8 ,, ,,
38. "Mound of Many Cities," Pl. 5, Fig. 191.
39. ,, ,, ,, ,, ,, 188.

Plate XLII.—Painted Fabrics from Kouyounjik (for comparison).

[Reproduced through the courtesy of Messrs. Chapman and Hall.]

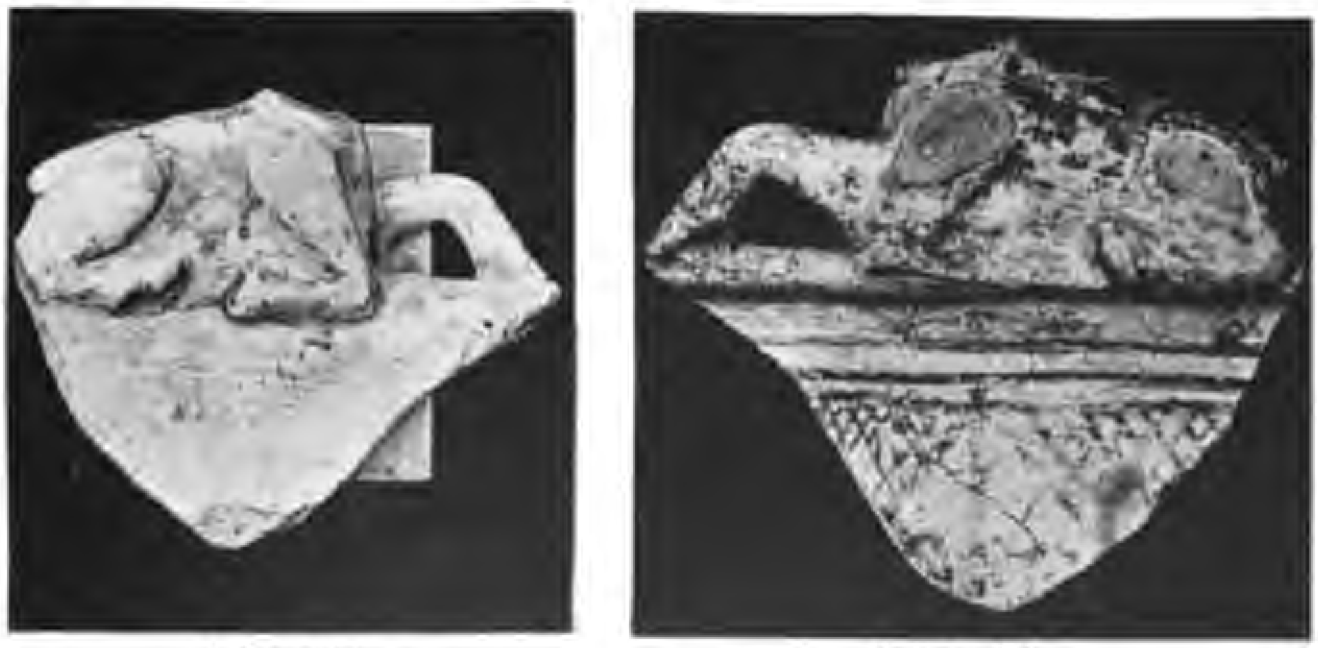
40. Perrot-Chipiez, *Histoire de l'Art dans l'Antiquité*, Vol. II (Assyria), Fig. 377; (Engl. Transl., Fig. 187
41. ,, ,, ,, ,, ,, ,, Fig. 375 ,, ,, ,, 185).
42. ,, ,, ,, ,, ,, ,, ,, 379 ,, ,, ,, 189).
43. ,, ,, ,, ,, ,, ,, ,, 373 ,, ,, ,, 183).
44. ,, ,, ,, ,, ,, ,, ,, 378 ,, ,, ,, 188).
45. ,, ,, ,, ,, ,, ,, ,, 374 ,, ,, ,, 184).
46. ,, ,, ,, ,, ,, ,, ,, 372 ,, ,, ,, 182).

Journal of the Anthropological Institute, Vol. XXXIII, 1903, Plate XXXIX.



1. Front View. 2. Back View.

TERRA COTTA HORSEMAN FROM KECHNE HAMMAM.

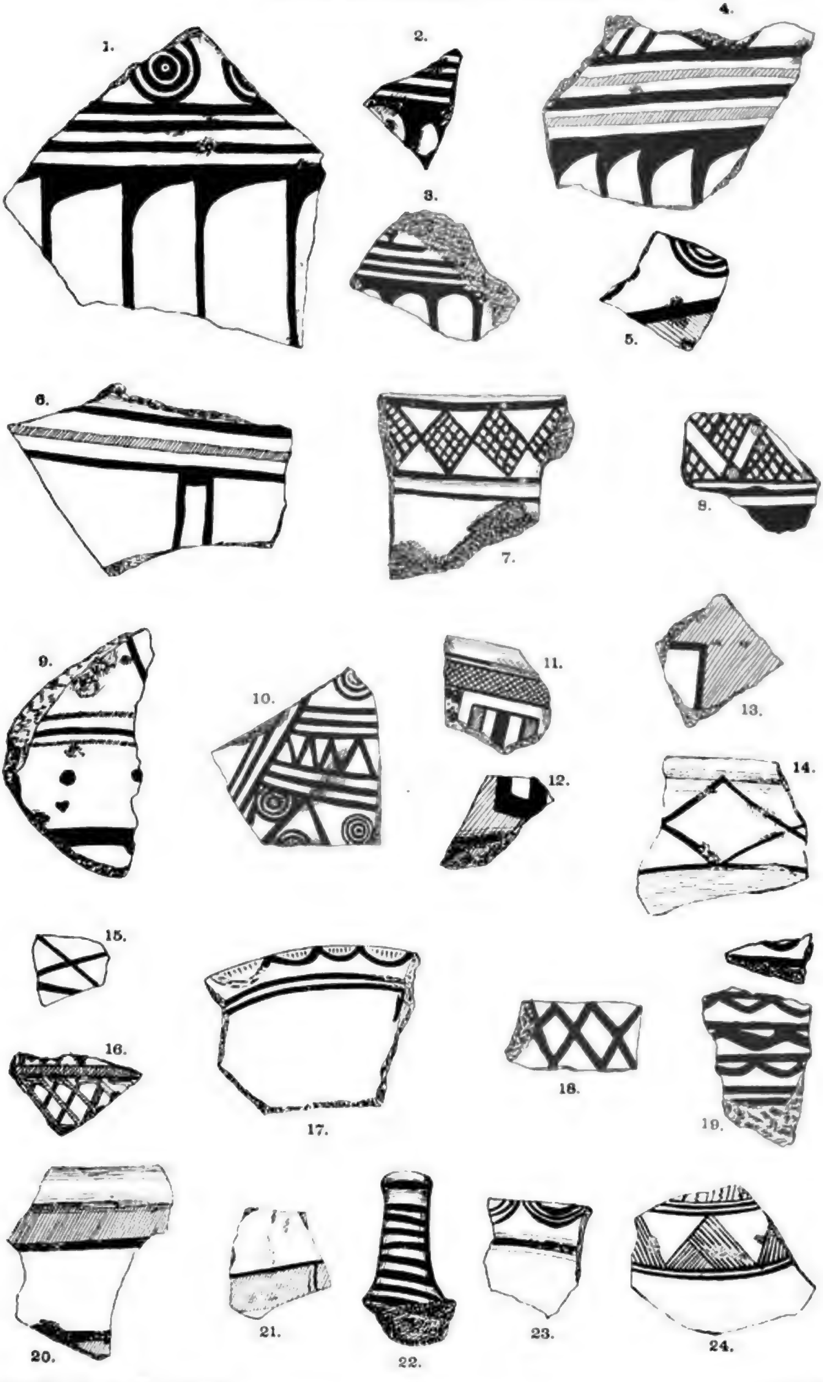


3. Inner Side. 4. Outer Side.

RIM OF CLAY VESSEL, WITH MODELLED ANIMAL, FROM BOLUS.

THE EARLY POT-FABRICS OF ASIA MINOR.

Journal of the Anthropological Institute, Vol. XXXIII, 1903. Plate XL.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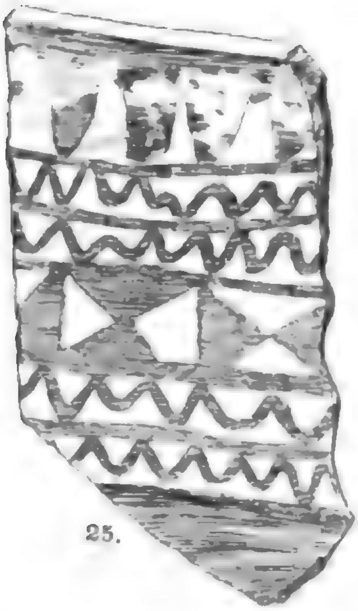
▬ = black ; = red.

J. L. M.

CAPPADOCIAN PAINTED FABRICS.

THE EARLY POT-FABRICS OF ASIA MINOR.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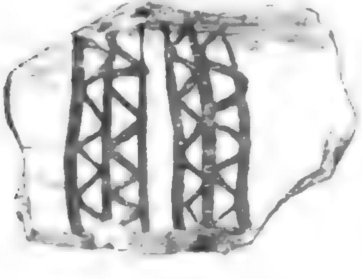
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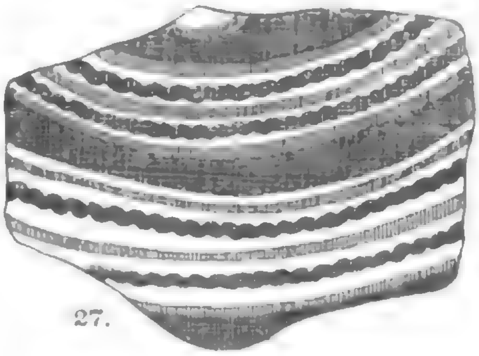
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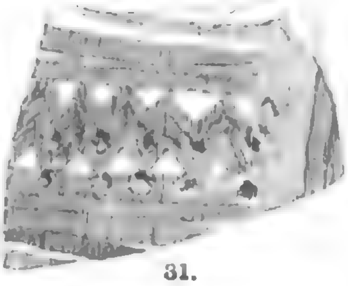
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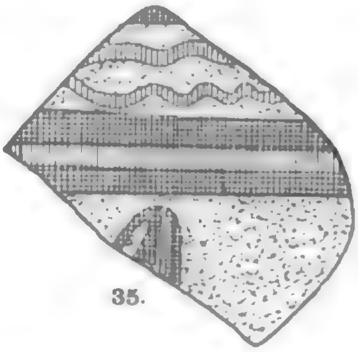
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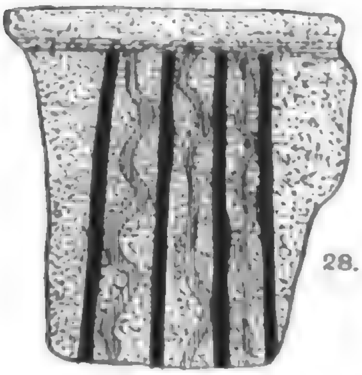
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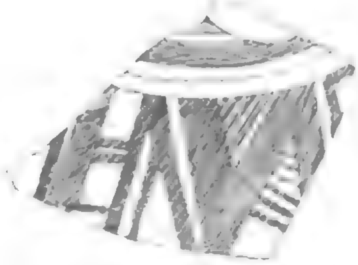
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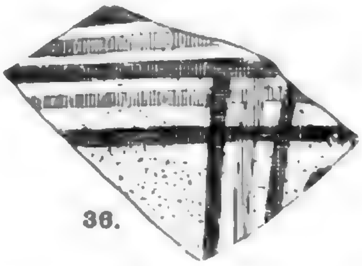
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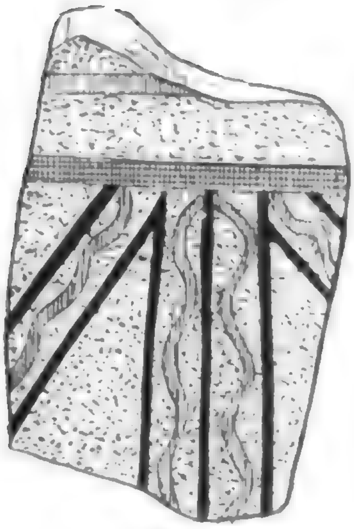
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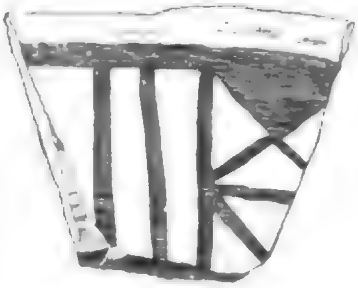
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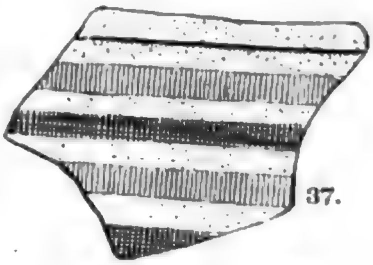
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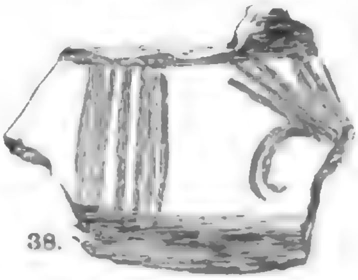
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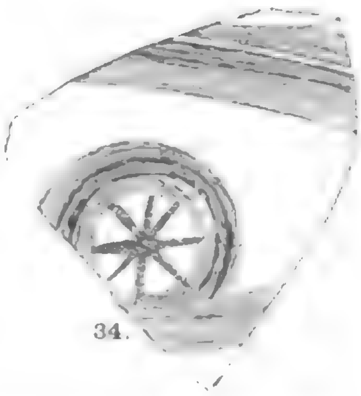
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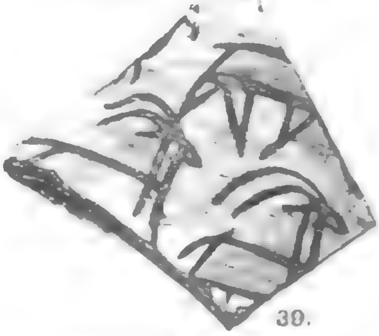
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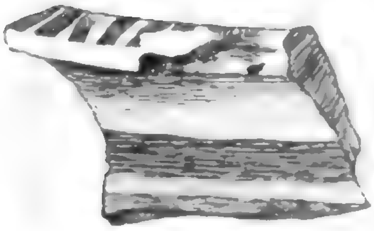
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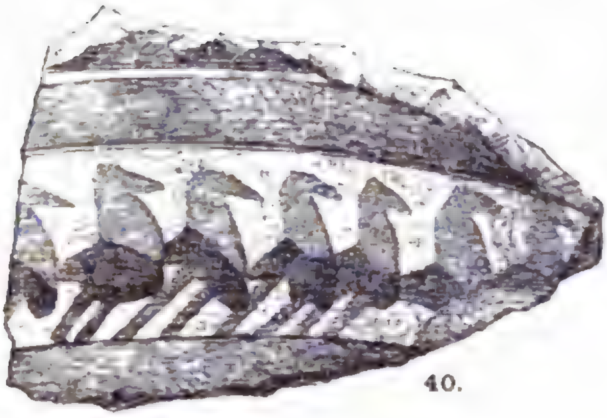
|| = black ; ▨ = red ; ∴∵ = buff ; ▭ = white.

PALESTINIAN PAINTED FABRICS (*for comparison*).

THE EARLY POT-FABRICS OF ASIA MINOR.

Journal of the Anthropological Institute, Vol. XXXIII, 1903, *Plate XLII.*



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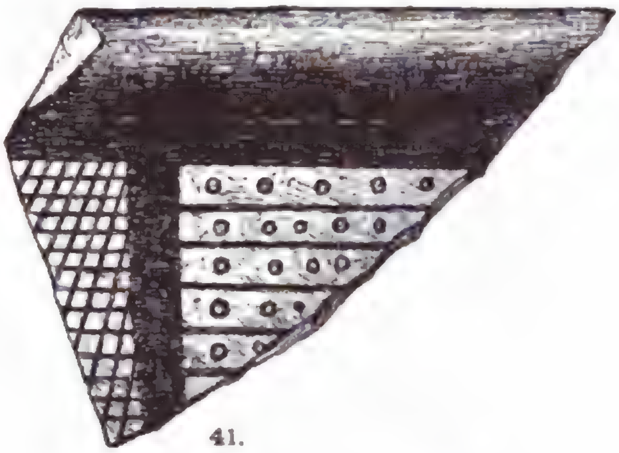

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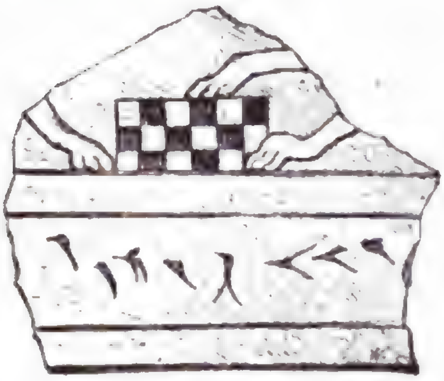

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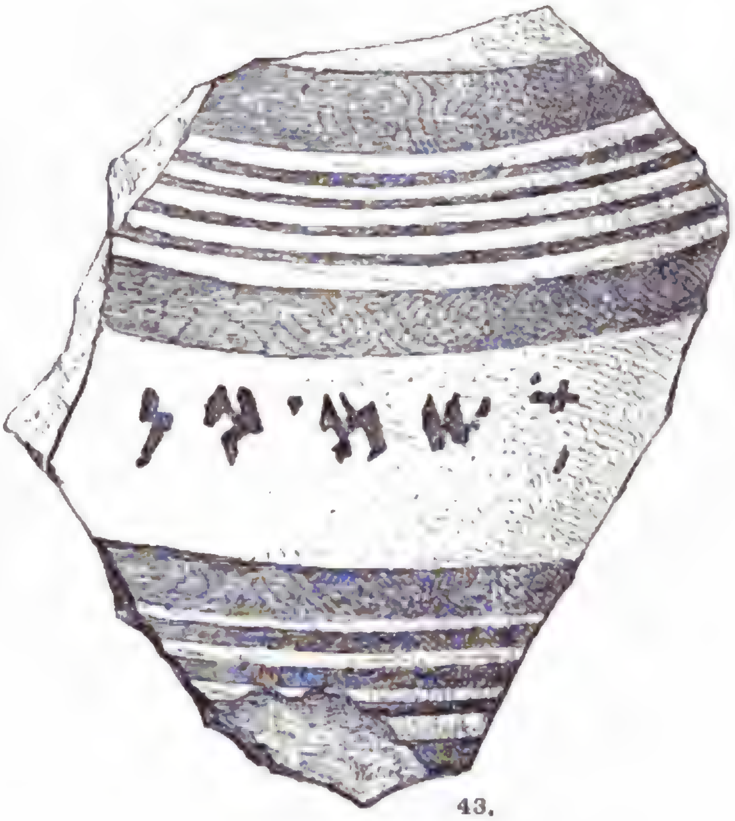

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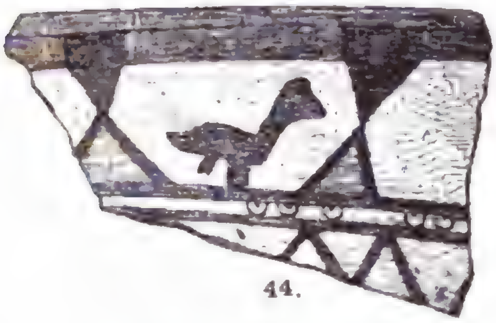

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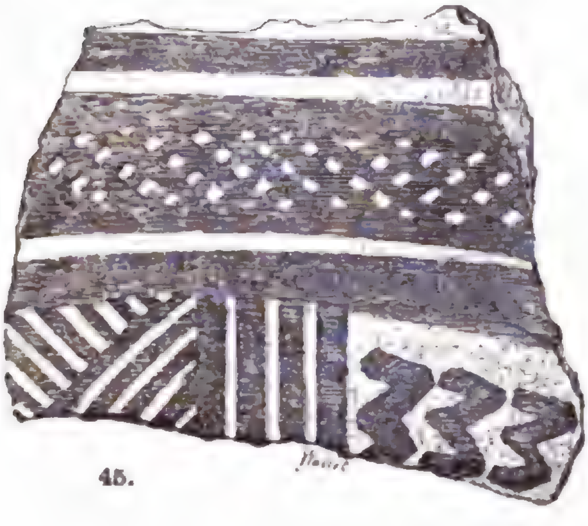

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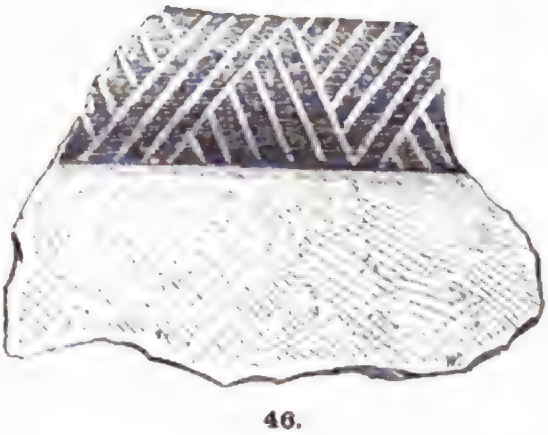

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